

ciency and economy than the others its net return will be increased relatively more than that of the others, and that the owners of its securities will benefit to that extent. But the most efficiently operated railroad will also share with all the other railways in its territory in any increase of net return which results from the adoption of a fair and intelligent policy of regulation, and whether such policy shall be adopted and adhered to also will depend mainly upon public sentiment.

Since this is obviously true, is it not a strange thing that the managements of many railways which are efficient in other respects, do little or nothing to improve the public sentiment upon which the net return they will be allowed to earn mainly depends? Is it not strange that while the importance to successful railway operation of a sound public sentiment is universally recognized, the necessity and importance of doing the things that will create such a sentiment receives relatively so little real recognition? Is it not strange that many railway managements will appropriate hundreds of millions of dollars of new capital to make improvements that will reduce operating expenses, and will then refuse to spend a relatively small amount of money to help create a public sentiment which will permit them to earn the increased net return which they ought to realize from these costly improvements? Is it not strange when every day for many years public sentiment has been the chief factor in determining the net return the railways have earned, that many railway officers apparently continue to regard public sentiment as only a temporary factor in their business, and seemingly proceed upon the assumption that some time, in some way or other, without anything in particular being done by them, public sentiment will cease to be a factor, or will become an unimportant one about which they need not bother themselves?

We have now had effective regulation of railways in this country for almost fifteen years. During all that time the general tendency of the net return of most railways has been downward, not because they have not been operated with efficiency and economy, but because public sentiment, acting through regulation, has constantly prevented the net return earned from being maintained and increased as it should have been as a result of this efficiency and economy. It ought now to be plain to every railway officer that increases in efficiency and economy, as necessary as they are, will never alone again make the railroad industry a prosperous industry. The measure of the prosperity of a business is the net return that it earns. The extent to which improvements and additions can be made which, in the long run, will enable an industry to do more business and do it more economically is determined absolutely and solely by the net return earned. Therefore, if we are ever again to have a system of railways which is prosperous, and which, because it is prosperous, can economically and adequately meet the demands of the public, there must be created and permanently maintained a better public sentiment regarding railroad matters.

In a recent address in Chicago, Sydney Anderson, a representative in Congress from Minnesota who voted for the Transportation Act, referred to the fact that when he re-

turned to his district for reelection last year, he found that misleading propaganda against this law and the railways had created widespread hostility to them among his constituents. He was able to overcome this, and was reelected. But he said pointedly that large business interests have no right to allow such propaganda against them to go unanswered for a period of months or years, and then expect members of Congress in a few weeks' campaign to undo its effects.

Honorable F. B. Carvell, chief commissioner of the Board of Railway Commissioners of Canada, in an address in Chicago last week, criticized the managements of the railways for not doing more to make the people understand their problem.

The *Chicago Tribune*, in an editorial in its issue of March 18, said: "Not since the fight for sound money, that is, in a quarter century, have there been presented to the American people issues of more vital, not merely to their material welfare, but to their moral and political character, than are several raised by western radicalism in its attacks upon alleged railroad evils and its proposals for their remedy. For example, in the guise of demands for squeezing out 'water' and for so-called 'deflation' of railway capital is the issue of confiscation. There is the very greatest need, therefore, that they should take place during the months intervening before the next Congress begins to consider railway legislation, a thorough public discussion of issues, interests, and proposals. If there had not been such discussion leading up to the election of 1896, there could have been no such decision as then was given decisively on behalf of the nation's financial integrity."

Who took the lead in 1896 in educating public opinion upon the money question? The large banking and other financial interests against whom the attacks were most directly made. They did not wait for others to lead the fight for them. They pointed out and made clear the disaster to the nation as a whole that adoption of free silver would cause. Others followed and took up their arguments and used them effectively.

The struggle now going on is directly a struggle over what net return the railroads shall be allowed to earn. Indirectly it is a struggle to determine whether the railways shall prosper or be bankrupted; over whether their development shall be absolutely stopped, or shall be continued and stimulated; over whether private ownership shall be maintained or destroyed; over whether, if government ownership is adopted, railway property shall be largely confiscated, or a just compensation shall be paid for it.

The problem presented is far more important and vital than that of increasing of efficiency and economy of operation—as important as that is. When the official personnel of the railways, and especially the higher executive officers, begin to devote thought, energy and money to the solution of the problem presented by public sentiment as they devote them daily to the problems of increasing the efficiency and the economy of operation, there will be some chance for the railways to begin to earn a reasonable net return, and for the solution of the entire railroad problem; but there will be not a chance until then.

ciency and economy than the others its net return will be increased relatively more than that of the others, and that the owners of its securities will benefit to that extent. But the most efficiently operated railroad will also share with all the other railways in its territory in any increase of net return which results from the adoption of a fair and intelligent policy of regulation, and whether such policy shall be adopted and adhered to also will depend mainly upon public sentiment.

Since this is obviously true, is it not a strange thing that the managements of many railways which are efficient in other respects, do little or nothing to improve the public sentiment upon which the net return they will be allowed to earn mainly depends? Is it not strange that while the importance to successful railway operation of a sound public sentiment is universally recognized, the necessity and importance of doing the things that will create such a sentiment receives relatively so little real recognition? Is it not strange that many railway managements will appropriate hundreds of millions of dollars of new capital to make improvements that will reduce operating expenses, and will then refuse to spend a relatively small amount of money to help create a public sentiment which will permit them to earn the increased net return which they ought to realize from these costly improvements? Is it not strange when every day for many years public sentiment has been the chief factor in determining the net return the railways have earned, that many railway officers apparently continue to regard public sentiment as only a temporary factor in their business, and seemingly proceed upon the assumption that some time, in some way or other, without anything in particular being done by them, public sentiment will cease to be a factor, or will become an unimportant one about which they need not bother themselves?

We have now had effective regulation of railways in this country for almost fifteen years. During all that time the general tendency of the net return of most railways has been downward, not because they have not been operated with efficiency and economy, but because public sentiment, acting through regulation, has constantly prevented the net return earned from being maintained and increased as it should have been as a result of this efficiency and economy. It ought now to be plain to every railway officer that increases in efficiency and economy, as necessary as they are, will never alone again make the railroad industry a prosperous industry. The measure of the prosperity of a business is the net return that it earns. The extent to which improvements and additions can be made which, in the long run, will enable an industry to do more business and do it more economically is determined absolutely and solely by the net return earned. Therefore, if we are ever again to have a system of railways which is prosperous, and which, because it is prosperous, can economically and adequately meet the demands of the public, there must be created and permanently maintained a better public sentiment regarding railroad matters.

In a recent address in Chicago, Sydney Anderson, a representative in Congress from Minnesota who voted for the Transportation Act, referred to the fact that when he re-

turned to his district for reelection last year, he found that misleading propaganda against this law and the railways had created widespread hostility to them among his constituents. He was able to overcome this, and was reelected. But he said pointedly that large business interests have no right to allow such propaganda against them to go unanswered for a period of months or years, and then expect members of Congress in a few weeks' campaign to undo its effects.

Honorable F. B. Carvell, chief commissioner of the Board of Railway Commissioners of Canada, in an address in Chicago last week, criticized the managements of the railways for not doing more to make the people understand their problem.

The *Chicago Tribune*, in an editorial in its issue of March 18, said: "Not since the fight for sound money, that is, in a quarter century, have there been presented to the American people issues of more vital, not merely to their material welfare, but to their moral and political character, than are several raised by western radicalism in its attacks upon alleged railroad evils and its proposals for their remedy. For example, in the guise of demands for squeezing out 'water' and for so-called 'deflation' of railway capital is the issue of confiscation. There is the very greatest need, therefore, that they should take place during the months intervening before the next Congress begins to consider railway legislation, a thorough public discussion of issues, interests, and proposals. If there had not been such discussion leading up to the election of 1896, there could have been no such decision as then was given decisively on behalf of the nation's financial integrity."

Who took the lead in 1896 in educating public opinion upon the money question? The large banking and other financial interests against whom the attacks were most directly made. They did not wait for others to lead the fight for them. They pointed out and made clear the disaster to the nation as a whole that adoption of free silver would cause. Others followed and took up their arguments and used them effectively.

The struggle now going on is directly a struggle over what net return the railroads shall be allowed to earn. Indirectly it is a struggle to determine whether the railways shall prosper or be bankrupted; over whether their development shall be absolutely stopped, or shall be continued and stimulated; over whether private ownership shall be maintained or destroyed; over whether, if government ownership is adopted, railway property shall be largely confiscated, or a just compensation shall be paid for it.

The problem presented is far more important and vital than that of increasing of efficiency and economy of operation—as important as that is. When the official personnel of the railways, and especially the higher executive officers, begin to devote thought, energy and money to the solution of the problem presented by public sentiment as they devote them daily to the problems of increasing the efficiency and the economy of operation, there will be some chance for the railways to begin to earn a reasonable net return, and for the solution of the entire railroad problem; but there will be not a chance until then.

In general it is safe to say that railway shop machinery and tools, especially in recent months, have not received the care and attention necessary to keep them in the best operating condition. High labor turnover was one reason for this state of affairs. With new men coming and going, great interest in the appearance or performance of machine tools could not be expected. Moreover, in many cases the new men simply did not care what happened to the machines. Careful attention should once more be given to the condition of machine equipment. Machinery and tools of all kinds should be thoroughly inspected, worn parts repaired or renewed, and ample provision made for systematic lubrication. It is no exaggeration to say that a few drops of oil in just the right spot will frequently increase the output of man and machine fifty per cent. A manufacturer recently complained that his chucks, for example, were subjected to much abuse and received little oil in railroad shops; not only that but they were retained in service long after their effective life was past. The railroads are now paying practically as high machinist's and mechanic's wages as any other industry and they cannot afford to get along with shop tools which are worn-out, or in anything less than the best operating condition.

Take Care of Shop Tools

The centennial movement is taking shape. What may be considered the first decisive step towards launching this movement was taken last week when the American Railway Engineering Association unanimously adopted a resolution expressing itself heartily in favor of a railway centennial and urging the beginning of immediate preparation for it. The resolution is addressed to the American Railway Association and "recommends that the railroads should give serious and immediate consideration to the holding of a centennial celebration, national in scope and even perhaps of international interest, representing the combined energies of all American railroads." There is reason to believe that the railroads will not allow their one-hundredth anniversary to pass unnoticed. Interest, as though awaiting but the suggestion for its development, has begun to spread. The engineers have already expressed themselves for it. The president of the American Railway Association is for it. Creditable press notices have appeared about it and altogether the signs are very encouraging for the fitting observance of this occasion.

Railroads and a Centennial

At Marylebone station, the London terminus of the Great Central section of the London & North Eastern Railway, a few weeks ago was held a unique exhibition. The occasion was the adoption of standard colors for locomotives and passenger cars of the newly consolidated railway. As is generally known, the various English railways have different standards of colors for their cars and locomotives and with the consolidation of the railways, it became necessary for each new system to decide upon a new standard to take the place of the varying ones of its constituent companies. The exhibition at Marylebone station consisted of equipment painted according to the standards of the Great Northern, Great Central and other constituent railways, together with equipment painted according to the new standards recommended by the mechanical department of the London & North Eastern. The strange feature of this exhibition, however, was that it was not held for the benefit of the general public, but for that of the directors of the railway. The mat-

A Unique Exhibition

ter of color was considered important enough to refer to the board of directors for decision. This is a notable instance of the importance which the British roads place in appearance, an importance which, it must be admitted, is not accorded to the subject by many railroads in this country.

Estimates and Facts

Many articles have been written comparing steam and electric motive power for railroads. Generally they state that electric power permits more rapid acceleration, that stand-by losses are reduced or eliminated, large overloads can be handled for short periods, smoke is eliminated, coal and water stations are not needed, locomotive coal need not be hauled, less coal is used, etc. On the other hand, it is shown that when steam power is used, intricate and interdependent power distribution facilities are not required, capital expenditures are reduced, no trouble is caused by inductive interference or electrolysis, and so on. All these statements are generally accepted as facts, but it is unfortunate that most of them of necessity are qualitative rather than quantitative. For example, it is variously estimated that electric operation will save all the way from 10 to 70 per cent of the annual coal bill. Actual figures in one case indicate the saving to be 28 per cent, but even these figures are open to criticism. It is for this reason that we welcome such facts as the following: Electric locomotives on the Chicago, Milwaukee & St. Paul are used to haul trains on continuous runs of 440 miles except for station stops; switching locomotives on the New York, New Haven & Hartford are kept in continuous service 24 hours a day for more than 70 per cent of the total time without being shopped for even minor repairs while road engines frequently make 500 miles a day and average 33,000 miles per locomotive failure; multiple-unit cars on the Pennsylvania operate with an average of over 48,000 car miles per detention. A recently issued statement also announces that several of the 41 passenger locomotives which have been in service for 16 years have now been run more than 1,000,000 miles. Facts like these do two things; namely, establish the dependability of electric equipment and make easier the decision of the road which wishes to determine whether or not it should adopt electric operation.

Britain's Successful Institute of Transport

THE INSTITUTE OF TRANSPORT of Great Britain, which was inaugurated less than three years ago, has rapidly risen to a high rank among the professional societies of the realm. Its success should make its form of organization and its methods of pursuing its work, which are described elsewhere in this issue, of particular interest to those who are forwarding the plans for the establishment of the National Transportation Institute in this country.

Membership in the British institute is restricted to those actively engaged in some enterprise actually connected with transportation, whereas some of the strongest promoters of the transportation institution in this country come under the category of users, rather than providers, of transportation. In other ways also the British institute differs materially from the proposed American institution, yet the fundamental purpose of both is, or should be, the same—the promotion and dissemination of knowledge concerning all forms of transportation.

The inclusion of representatives of users of transportation in the American institution has one great advantage, viz.,

convincing the public that the organization exists to disseminate facts and not propaganda. In order to attract and retain the interest of transportation men, however, certain safeguards should be set up to make the society primarily an organization of transportation men. Unless this is done the organization might tend to get away from the hard facts of present-day problems and devote its time to the consideration of fanciful plans for the future. Such a society has a place for men who look at transportation entirely from the public point of view. Its greatest need, however, is for a predominant membership of practical men actually engaged in transportation or closely associated with it who are interested in ways and means of improving the service and efficiency of every branch of transportation—railway, highway, water and air—and in co-ordinating the activities of these branches.

A strong factor in the success of the British institution is the careful selection of members, even among those engaged in transportation. The qualifications necessary for full membership are severe and those for associate membership scarcely less so. The work of the institute is important and its direction must be in competent hands. The rather severe qualifications serve the dual purpose of barring those not competent to take part in the work and, by their exclusiveness, make association with the institute an honor, and consequently attractive, to those who can qualify.

The British institute provides for the education of students, as is contemplated under the plans for the American society. To date the enrollment of students has not progressed as rapidly as might be expected, but in this connection it should be noted that the various individual railroads provide educational facilities of much the same nature and of which thousands of energetic young employees avail themselves. No such facilities are provided by American railroads and consequently the program of the American institute for class instruction would probably be far more successful than in Great Britain.

The *Railway Age* does not believe that the American institution should be modeled after the British. It does feel, however, that the utmost advantage should be taken of the experience of the British society in order that we may profit by its successes and its failures.

The Treatment of Ties

WE HAVE referred in recent issues to the necessity for railway managements, and particularly for engineering and maintenance-of-way officers, to give more attention to the procurement of ties. There is another phase of the tie problem which has received greatly increased attention during the last three or four years, but which deserves even more consideration. This is the treatment of ties to protect them against decay. The railways use over one hundred million ties annually. The kinds of wood now available for use as ties will probably not give, untreated, an average life of over seven years, while many will require renewal in three to four years. Yet even the woods most susceptible to rot can be kept from decaying for 12 to 20 years by proper preservative treatment.

That this is not mere conjecture is shown by the records of renewals compiled for a long period of years by the Santa Fe. This road is a pioneer in the treatment of ties and has installed treated ties extensively for 35 years and almost exclusively for more than 13 years, and its renewals for all lines east of Albuquerque, N. M., comprising more than 7,000 miles of line, indicate an average life of more than 16 years. That service is being obtained from ties, many of which are mechanically weak, and constant improvement in their protection from wear by the use of improved plates will be reflected in still further increased tie service.

Many of these ties go into tracks in eastern Texas and Louisiana, where climatic conditions are most unfavorable to tie life. If the Santa Fe can secure such results with inferior woods and under severe climatic conditions, it should not be too much to expect that the average life of treated ties over the country can be raised to 20 years or approximately three times that of the present general average of untreated ties.

That we are in a fair way of reaching this figure on many roads is indicated by the wide interest now being shown in timber treatment. In 1921 for the first time in the history of the country more than half of the ties inserted in track were treated. With the completion of other plants under consideration, and in contemplation, this ratio should increase still more. The evidences of economies of timber treatment are long delayed but they are nevertheless real. As the number of ties treated increases, purchases for renewal should decline, thereby offsetting in part at least the rising cost of timber products and conserving the fast diminishing supply.

The "Car Shortage" Is Again Increasing

WHILE the railways are breaking all records for this time of year in moving freight, the shortage of transportation is again beginning to increase. There has been a car shortage ever since the week ended September 23, 1922, when, after the termination of the coal strike, coal began to be shipped in large volume. The car shortage reached its maximum in the last week of October, and then declined steadily until the week ended February 8. At that time the total unfilled requisitions for cars amounted to 70,522, while the number of cars in other parts of the country for which there were no immediate orders was 28,628, making the net car shortage 41,894. The car shortage then began to increase, and in the week ended February 28 the net shortage in the country was 64,814 cars. The reason for this increase is not difficult to find. In the week ended February 11 the total number of cars loaded with freight was 853,289, while in the week ended March 4, in spite of bad weather, it was 917,896. This was the largest number of cars ever loaded with freight in any week of any year before June.

It is well worth while to speculate regarding the extent to which freight shipments, and also the shortage of transportation, may be expected to increase. In the first nine weeks of the present year the number of cars loaded with freight was 7,665,157. This was an increase of 15 per cent over 1922, and in increase of $6\frac{1}{2}$ per cent over 1920, the previous record year. Most signs indicate, however, that the country is in the midst of a period of increased general business activity, and in the past periods of business activity the amount of freight handled by the railways has increased much more than this. In the year ended June 30, 1916, the total freight handled was 24 per cent greater than in 1915, and 14 per cent greater than in 1913, which was the record year up to that time.

Although the increase in freight moved thus far this year is nowhere near as large relatively as it was in 1916, during the last business revival, the car shortage already is beginning to increase. Why is this the case? The answer is obvious to everybody familiar with the facts. In the seven years ending with 1915 the tractive power of the locomotives in the country increased about 50 per cent, while in the seven years ending with 1922 it increased about 25 per cent. In the seven years ending with 1915 the total carrying capacity of the freight cars in the country increased about 55 per cent, while in the seven years ending with 1922 it increased about ten per cent. The increases in other railway facilities

in the two periods were in about the same relative proportion. Naturally, the railways cannot now increase the business handled by them to relatively as great an extent as they could and did in 1916.

Considering all the conditions, the railways are doing extremely well in handling as much business as they are. It is still a law of nature that you can't put a quart in a pint bottle. The government has so regulated, and under government control so managed the railways that the increase in the tractive power of their locomotives in the last seven years has been relatively only one-half as great and the increase in the capacity of their freight cars relatively only one-fifth as great, as in the preceding seven years. The public, which is responsible for this governmental policy, will have to bear as best it can the inevitable shortage of transportation which has resulted.

The *Railway Age* a few weeks ago advised the producers and shippers of the country to "load heavily and ship now" in anticipation of an increase in the shortage of transportation which has now actually begun. We now amend this advice to read: "Load heavily, ship now, and use your influence with the Interstate Commerce Commission and Congress in favor of a rational railroad policy." There is very good reason for believing that as the activity of business increases the shortage of transportation will be felt more acutely than ever before, because it is far greater than any but a few people realize. It will not be relieved by unjust denunciation and unfair regulation of the railways. These are the things that have caused it, and continuance of them will simply aggravate it. There is but one remedy for the situation. This is a policy of regulation which for years to come will enable the railways to earn a larger net return, and which will thereby make it possible for them to raise more capital to invest in enlargements of their facilities. The surest way to increase the already vast shortage of transportation would be to adopt regulation such as is advocated by the Brookharts, Cappers, LaFollettes and other reactionary self-styled "progressives."

Ten Years of Progress in Locomotive Stokers

ONE OF THE MOST interesting developments in modern railway operation is that which has taken place during the last few years in mechanical stokers for locomotives. Ten years ago the mechanical stoker was virtually unknown, except as an experiment which promised unlimited possibilities if it could be worked out on a sound, practical basis. The need of such a device, however, was becoming more and more evident, as the tendency in motive power design continued toward heavier types, with the prime object of increasing train tonnage. At last the point was reached where it was realized that many of the advantages gained by building larger locomotives were lost through the physical inability of the fireman to fire them to capacity.

Fortunately the situation had attracted the attention of the manufacturers and the result of this was the development of several types of stokers which ultimately demonstrated that the largest locomotives could be fired satisfactorily by mechanical devices. Since that time the question of firing has imposed no restrictions on the designing of heavy motive power.

Today the mechanical stoker is a recognized part of the modern, large type, coal-burning locomotive. Scarcely any railroad, for example, would think of ordering heavy freight locomotives without including stokers, and stoker-fired passenger locomotives are now quite common on a number of roads. This extensive use, after years of experience, indicates that the stoker is a thoroughly practical substitute

for, and an improvement over, hand firing, and that it is here to stay.

A striking illustration of the manner in which the railroads have responded to the mechanical stoker is found in the fact that one of the stoker manufacturers has recently applied its five thousandth locomotive stoker. Eighty railroads now have mechanical stokers in service. Nearly 10 per cent of the locomotives on American railroads are so equipped, practically all the installations having been made within the last 10 years.

Representing the Farmer

ON ANOTHER PAGE we are publishing by request a letter from Benjamin C. Marsh, managing director of the Farmers' National Council, who apparently takes some exception to a recent reference in this paper to his organization as attempting "an appearance of representing the farmer" in some of the various interlocking organizations of labor and other "radical" or "progressive" leaders in Washington. He apparently also objects to the word "radical" as applied to proposed legislation to promote government ownership of railroads. As to the latter, we shall be glad to substitute the word "progressive" or any other word if he can refer us to any proposal that the government buy the railroads for what they are worth, but as long as the appraisal is being made by such men as Marsh, La Follette or Brookhart, we are inclined to let it stand.

We had heard before receiving the letter that Mr. Marsh's organization had been carrying on an active lobbying and propaganda campaign in Washington against the railroads and other corporations for the last four years under the present name, as well as of his previous activities in the same direction before he undertook to represent the farmers as in an alliance with the railroad labor unions. Also we have no particular occasion to dispute his statement that "there never was a time when so many farmers were working and voting for the program of the Farmers' National Council as now," since he carefully refrains from referring to any definite number of farmers.

As a matter of fact, the *Railway Age* has no specific information as to just how many of the millions of farmers in the United States do or do not approve of Mr. Marsh and his program or as to how many had a voice in formulating that program. If this information had been available it might have said that the farmers were being misrepresented by the Farmers' National Council. The more guarded language used was due to the fact that repeated efforts of Congressional committees to elicit information as to whom Mr. Marsh represents have brought out the names of several farmers' organizations as being among his constituents, but they have also indicated various other affiliations and have left the record somewhat vague as to how much more responsible the farmers were for the activities of the council since its organization than they were for Mr. Marsh's wild denunciations of the railroads before.

If Mr. Marsh will recall the testimony given at a hearing before the Banking and Currency Committee of the House of Representatives in 1921 by himself as executive secretary and director of legislation of the council, and by George P. Hampton, since deceased but then managing director, he will perhaps understand why the *Railway Age* attached no great significance to the fact that the Farmers' National Council has been working in some harmony with the officers of certain railroad labor unions in spite of the fact that some other large organizations that assume to speak for the farmer have not done so nor declared for government ownership. The printed record of that hearing shows that Mr. Marsh was asked so many questions regarding his organization that he was led to remark that "it is a funny thing I

am asked, whenever I suggest a proposition for the council, approaching a fundamental proposition, whether we are fakers or not."

Neither Mr. Marsh nor Mr. Hampton referred to any authorization from farmers to represent them other than that their organization had been formed at a "reconstruction convention" of delegates of various farm organizations held in Washington in January, 1919, four years ago. After naming a number of these organizations, which he said were affiliated with the council to the extent of adopting its recommendations and sometimes contributing to its expenses, Mr. Hampton said that it would be difficult to state the total membership but that it was "estimated" that at the time the "reconstruction program" was adopted two years before "there were 750,000 organized farmers who endorsed that program." The council, he said, had done little field work; "we simply put the matter up to and call upon the organizations to do the field work." He also said that some of the organizations later had arranged to "come in on a dues-paying basis" but his statement of the receipts for the support of the Farmers' National Council for 1920 showed little evidence of active support from many farmers.

Of a total of \$15,793.78 received and disbursed, according to his statement, \$5,300 was from Ed. C. Lasater, a member of the council, "for packer control, transportation and credit sections of Farmers' National Council program," \$2,500 was from William Kent, \$1,917.95 from the All-American Co-Operative Commission, another organization of which Mr. Hampton was general manager; \$1,933 was from the Plumb Plan League, "for part payment of triple alliance meetings in support of two-year extension of government control of railroads;" \$1,682.70 for special news service for farm papers; \$50.29 for incidental special service, and \$500 from Mrs. Mary Fels and other single taxers; while there was \$900.84 from the Washington State Grange, \$300 from the Gleaners, \$200 from the Michigan Potato Growers Exchange and \$509 of small subscriptions from individuals.

Mr. Hampton said that when the organization was formed he had assumed the financial responsibility and he had "many a time" had to go down into his own pocket to meet the deficit. Both he and Mr. Marsh told the committee they were single-taxers but that the single-tax activities have nothing to do with the Farmers' National Council. As to whether its program is "radical" or not, perhaps some opinion may be formed from Mr. Marsh's statement that the council "advocates a capital tax upon all property and taking of at least 75 per cent of all property and paying the war debt with it instead of trying to saddle it upon the workers."

As to the representative character of the organization, it is apparent that it represents the views of those farmers or railroad employees who may be so gullible as to believe what Mr. Marsh says.

New Books

I. C. S. Traffic Man's Handbook. Edited by Asa Colton, lecturer on trade and transportation, New York University. Bound in cloth. 386 pages, 5¼ in. by 3½ in. Published by International Textbook Company, Scranton, Pa. Price, \$1.00.

The purpose of the book is to provide a handy work of reference for industrial and railroad traffic men, shippers, shipping clerks and others who are interested in shipments. The book treats very fully on classification, packing, marking, routing, traffic, construction and the application of tariffs which are valuable to both railroad and industrial traffic men. It also includes a description of express and parcel post shipments, transit privileges, the special transportation services afforded by carriers and the general methods of handling claims, and shows many of the documentary forms used in traffic work. A description of an industrial traffic department is also included.

Letters to the Editor

[The RAILWAY AGE welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about 250 words—are particularly appreciated. The editors do not hold themselves responsible for facts or opinions expressed.]

Telephone Train Dispatching on the Southern Pacific

SAN FRANCISCO, Calif.

TO THE EDITOR:

In connection with your editorial of January 27, page 258, on telephone train dispatching in Europe, your readers will be interested in knowing that at the present time the Southern Pacific has in use 2,922½ miles of selective ringing dispatching circuits on the different divisions of the Pacific System. We have just recently completed 859 miles of telephone train dispatching circuits, and expect in the near future to install additional telephone train dispatching circuits in lieu of the Morse telegraph. All experience shows that the use of the telephone is a superior factor in expediting heavy traffic and reduction of train delays. In addition to our selective ringing dispatching circuits, we also have communicating telephone circuits covering a distance of 1,836 miles.

E. ENTELMAN,
Supt. of Telegraph.

Train Order Form 19

LOUISVILLE, Ky.

TO THE EDITOR:

In answer to Wm. Nichols' letter published in the *Railway Age* of December 2, 1922, page 1032, I feel gratified that such an authority on train operation as Mr. Nichols cannot find more to criticize than he did in my proposal for signal indications to replace written train orders. Mr. Nichols is a bit inconsistent, however, since in his treatise on Train Operation, published in 1916, he says: "With a proper block signal system with signals to govern train movements into and out of sidings, trains may be moved safely on single track without train orders and with but few rules."

Mr. Nichols says that the "19" order for restricting trains may be used with equal safety without the advantages of an automatic block system. Are we to understand that the automatic signals do not provide additional safeguards? If so a lot of money has been spent foolishly. I am inclined to agree that the "19" order can be made use of more freely in non-automatic block territory than it is, but we must not overlook the fact that many roads still refuse to use Form 19 for restricting rights in automatic block territory. From my own experience, I know how difficult it is to get the operating department to use that form in such territory, let alone suggesting its use in non-automatic territory. I repeat with emphasis that the use of the "19" order for restricting rights of trains was, and is, brought about through the use of automatic signals.

We are told that one of the largest roads, on January 1, 1923, put in use the "19" order for restricting rights of trains over its entire system. This is good news, and a sign of progress. I suggest that the next step be to discard the written order as well, and rely upon the signal to give the information at the point where it is to be acted upon.

We believe that the system we propose does "eliminate the equality between a fast passenger train and a slow moving

75-car freight train." Such equality is eliminated by the direction of the train dispatcher, and the orders given by the signals. It is not necessary that the operator and the dispatcher see the actual movement of the trains to forestall a blockade. Many complicated interlocking and other signaling arrangements are now being handled by the operator without his actually seeing any of the movements made.

Mr. Nichols apparently has overlooked the point that telephones are provided at all order signals, which makes it unnecessary to use the emergency telephone sets except when some serious unforeseen delays occur out on the line.

I do not understand to whom Mr. Nichols refers in speaking of "some of our non-operating friends are going to be disappointed." If he refers to the signal engineers, I wish to point out that the signal engineer has been, and is, the real operating pioneer, and on many roads he is already so recognized; on others he will be, as the advantages of operating under efficient signaling systems become better understood. Our operating friends were opposed, as a unit, to the scheme of single track automatic signaling known as the absolute permissive system. We assume that Mr. Nichols is not experienced in this method of operation, as that system in a large measure demonstrates how easy it is for a train to do station work without interfering with trains at the next station, or how a train at an outlying switch is kept from interfering with other trains. On those roads which are now using this system, the operating men are its biggest boosters. It is our belief that history will repeat itself in the matter of substituting the signal order system for the written order system.

The absolute permissive automatic block scheme of signaling has been the entering wedge towards operating trains on single track by having orders communicated to the engineman by fixed out-door signals instead of by written sheets handed out by the station operator. Let the signal engineer demonstrate to you how readily it can be done.

A. R. FUGINA,

Signal Engineer, Louisville & Nashville.

The "Traffic Unit" in Statistical Analysis

WASHINGTON, D. C.

TO THE EDITOR:

The article by "Analyst" in the *Railway Age* of February 24, page 463, demonstrates that the so-called "traffic unit," which is a combination of ton-miles and passenger-miles, must be used with caution. But it would be unfortunate if on that account its use were wholly abandoned. It is convenient frequently to have one figure to represent the approximate total service output of a railroad. It is elementary that the ton-mile unit itself must be used with caution. It means one thing on the New Haven and another thing on the Norfolk and Western. The ton-mile on certain roads meant one thing in 1920 and something quite different in 1921, because of the relatively small ore traffic. Yet "Analyst" would hardly contend that the statistical value of the ton-mile is on that account nullified.

It may be of interest to have a concrete example of how the traffic unit, in the form of the "equivalent ton-mile," may be used to show a trend that cannot be brought out with equal convenience in any other way. A statistical device, like a mirror with an uneven surface, may be defective and yet be an aid to revealing important truths.

The concrete example relates to the trend of the revenue per unit of traffic in relation to the cost per unit of traffic on steam railroads over a long period of years. The trend of the revenue per ton-mile in relation to the general trend of wholesale prices has received attention in the columns of the *Railway Age*, but it is important to consider in that connec-

tion also the trend of the cost per ton-mile, which has not received the same attention. In the accompanying table the figures in the column "Equivalent ton-miles" are obtained by adding to the ton-miles 3.67 times the passenger-miles. The same trend would have been shown if a factor of 0, 1, 2, 3, or 4 had been used. The particular factor 3.67 was chosen in order to make the equivalent ton-mile revenue figure approximate that for the actual ton-mile revenue. The number of equivalent ton-miles each year is then divided into the operating revenues and operating expenses respectively.

It will be noted that from 1890 to 1900 there was a fall in both the unit revenue and the unit expense, then to 1904 they both increased, but thereafter, until the outbreak of the European War, the unit revenue showed a downward tend-

REVENUES, EXPENSES AND NET RAILWAY OPERATING INCOME OF STEAM ROADS IN THE UNITED STATES IN COMPARISON WITH TRAFFIC AND WHOLESALE PRICES—1890-1921

Year ended	Railway operating revs. (millions)	Railway operating exps. (millions)	Net railway operating income (millions)	Equivalent ton-miles (millions)	Per equivalent ton-mile			Index number of wholesale prices (1913-100)
					Revenues (mills)	Expenses (mills)	Income (mills)	
June 30:								
1890	1,052	692	330	199,688	8.79	5.78	2.76	81
1891	1,097	732	333	128,212	8.55	5.71	2.60	80
1892	1,171	781	358	137,283	8.53	5.69	2.61	75
1893	1,221	828	358	145,809	8.37	5.68	2.45	77
1894	1,073	731	305	132,777	8.08	5.51	2.30	69
1895	1,075	726	312	129,959	8.27	5.58	2.40	70
1896	1,150	773	339	143,218	8.03	5.40	2.37	67
1897	1,122	753	328	140,122	8.01	5.37	2.34	67
1898	1,247	818	387	163,182	7.64	5.01	2.37	70
1899	1,314	857	412	177,217	7.41	4.84	2.33	75
1900	1,487	961	481	200,456	7.42	4.80	2.40	81
1901	1,589	1,030	511	210,765	7.54	4.89	2.43	79
1902	1,726	1,116	560	229,551	7.52	4.86	2.44	84
1903	1,901	1,258	590	249,982	7.60	5.03	2.36	86
1904	1,975	1,339	579	254,980	7.75	5.25	2.27	86
1905	2,082	1,391	633	273,810	7.61	5.08	2.31	86
1906	2,326	1,537	720	308,241	7.55	4.99	2.34	89
1907	2,589	1,749	767	338,328	7.65	5.17	2.27	94
1908	2,441	1,710	635	325,116	7.51	5.26	1.95	90
1909	2,473	1,650	710	325,634	7.60	5.07	2.18	97
1910	2,812	1,882	805	373,699	7.53	5.04	2.15	101
1911	2,853	1,976	745	375,634	7.59	5.26	1.98	93
1912	2,906	2,035	727	385,676	7.54	5.28	1.89	99
1913	3,208	2,249	807	428,979	7.48	5.24	1.88	100
1914	3,128	2,280	675	418,398	7.48	5.45	1.61	98
1915	2,956	2,089	694	396,318	7.46	5.27	1.75	101
1916	3,473	2,277	1,003	469,393	7.40	4.85	2.14	...
Dec. 31:								
1916	3,691	2,426	1,059	495,431	7.45	4.90	2.14	127
1917	4,115	2,906	953	545,429	7.55	5.33	1.75	177
1918	4,985	4,072	503	567,368	8.79	7.18	.89	194
1919	5,250	4,499	455	539,057	9.74	8.35	.84	206
1920	6,311	5,958	15	587,510	10.74	10.14	.03	226
1921	5,633	4,669	601	447,800	12.58	10.43	1.34	147

*From Bulletin No. 320, Bureau of Labor Statistics in the United States Department of Labor.

ency and the unit cost a slight upward tendency, but a very much less rapid one than the upward trend in wholesale prices. The fact that, in spite of a marked upward trend in material prices and in the pay of railroad labor per hour (not shown in the table) the cost of producing a ton-mile rose only gently, is doubtless to be explained by the economies of a denser traffic and improved methods of conducting transportation. In other words, regulation succeeded in compelling the railroads to give to the public the benefit of such economies. This is not the place to enter into a discussion of the question whether the price of transportation was held down for too long a time. It is the purpose here merely to show that averages based on the "traffic unit," may on occasion be useful. There is also included in the table, the net railway operating income per equivalent ton-mile. This shows a distinct downward trend, notwithstanding the fact that the aggregate annual profit increased. In other words, the charge per ton-mile paid by the public contained a smaller amount of profit per unit to the railways when, as in 1916, the aggregate net was over a billion dollars, than in the earlier years when it was less than 400 millions.

M. O. LORENZ.

Radical Railroad Legislation

WASHINGTON, D. C.

TO THE EDITOR:

My attention has been called to your article of February 3 entitled, "Plans for Radical Railroad Legislation" in which you use the expression, "but an appearance of representing the farmers is attempted by the Farmers' National Council and a considerable number of the members of Congress who were elected largely by farm votes are affiliated with them." I want to inform you that the Farmers' National Council was organized four years ago this month. It has been functioning ever since and there never was a time when so many farmers in the nation were working and voting for the program of the Farmers' National Council as now.

We shall appreciate your printing this letter and assure you that the Council is not urging any "radical" railroad legislation or any other kind of "radical" legislation. We are working for a progressive fundamental program, which you know has got to go through, or we are going to have more serious trouble in this country which is now threatening. Government ownership of railroads is not half as radical as you would make out and as you doubtless know. Should the railroads unload on the government for say, 22 billions, about seven or eight billions more than they are entitled to, most of the railroad executives and big stockholders would be whooping it for government ownership.

Do not try to fool all the people all the time, because it can't be done, although you are pretty good at trying.

BENJAMIN C. MARSH,
Managing Director, Farmers' National Council.

Tips for Subordinate Officers

RICHMOND, QUE., Canada.

TO THE EDITOR:

My experience in Canadian roundhouses, in which I have had the privilege of working, has led to the conviction that in the great majority of instances where co-operation is lacking the "middle men" are to blame. Railroad officials, from superintendents up, I have found fair in all respects, willing at all times to correct errors and to deal justly with grievances brought to their attention.

The same cannot truthfully be said regarding all road foremen, locomotive foremen, charge hands and leading hands, which I shall classify as the "middle men." Friction is often caused when a road foreman walks into a roundhouse and starts to line out a charge hand over a certain job, without first acquainting himself with the full particulars. A locomotive foreman sometimes places too low a time limit on work to be performed, not taking into consideration lack of material or other adverse conditions. Charge hands often ask men to do unreasonable things and to work under trying conditions—and last, but not least, a leading hand is often jealous of a mechanic under his supervision. Experience has taught that notwithstanding the fact that our officials are ever preaching "co-operation with employees" conditions are not always what they should or could be in these respects.

On numerous occasions I have seen a road foreman walk into a roundhouse and use obscene language to a charge hand in the presence of men who were under the supervision of the charge hand. This indicates a lack of good judgment. I would suggest that a road foreman do all in his power to avoid this error; that in the case of any difficulty arising over work performed by the roundhouse staff he first acquaint himself with the full particulars by making an examination of the engineers' work report, also of the work booked off against the report; then if there is reason for complaint, the place for him to lodge it is with the locomotive

foreman in his private office and not to voice his arguments all over the roundhouse. Locomotive foremen should use the utmost precaution in estimating the time required to perform an urgent repair job, since through lack of judgment a delay is often caused and friction is bound to follow. Estimates of this nature should be based on practical experience and then it is advisable to add a small margin of time as a safety factor.

Charge hands should encourage and consider the men working under their direction. Men like to work under good conditions, and under a man who shows some appreciation of their labors.

G. H. LOVETT.

Why Not Educate the Clerk?

BANGOR, Maine

TO THE EDITOR:

Do we really appreciate the fact that railroad clerical forces, especially in general offices, are literally a part of the machinery of management? A clearer recognition of this fact should lead to the adoption of a more progressive program for the training of such forces. Clerical work performed by persons not properly trained for it causes much exasperation, unpleasantness and waste of time and energy to railroad executives. Many of these troubles will be found to be directly traceable to the limited knowledge on the part of the clerical forces and accompanying lack of appreciation of the importance of the work in hand. The average clerical worker in a subordinate position may be found reasonably familiar with the ordinary routine of his work, but that is only a beginning; the fact that we often permit his development to stop there constitutes a weak spot in organization.

Do you suppose that the average payroll distribution clerk has ever had thoroughly explained to him the necessity for those distribution statements which he works so hard over, or has he ever followed the course of the information therein contained through the various records of the accounting department to the general ledger, or had explained to him the effect of those figures upon the financial statements finally rendered for the information and guidance of the management? Do you suppose that the average clerk working on material accounts in the stores or maintenance departments is any better informed as to the real meaning of his work and its vital importance in helping to enable the books to at all times reflect the true financial condition of the company's affairs and so set forth, as nearly as possible, actual operating costs? And how about billing clerks, fuel clerks and all the rest?

Is it not true that any person can work more intelligently if he has a good understanding of the final result that his work leads up to, and is not such knowledge necessary to fitness for promotion? It would be, of course, impossible to keep temporarily transferring employees from one office or department to another so that they might observe, from actual experience, the bearing that the work in their own home office has on that of all the others. Such a course would probably disrupt the organization to such an extent as to defeat its own ends.

But why not adopt a sort of "visiting day" once in a while, or even regularly, when clerical workers from one office may visit another and be instructed as to the relation of their own individual work to that of the office visited, and incidentally provide the personal point of contact which is so conspicuously absent when everything is handled through correspondence. Let everybody see what becomes of his grist after it gets to the mill. Any ordinarily intelligent person could not help but derive some benefit.

Is not such a program worthy of consideration?

W. A. R.

The Co-ordination of All Transportation

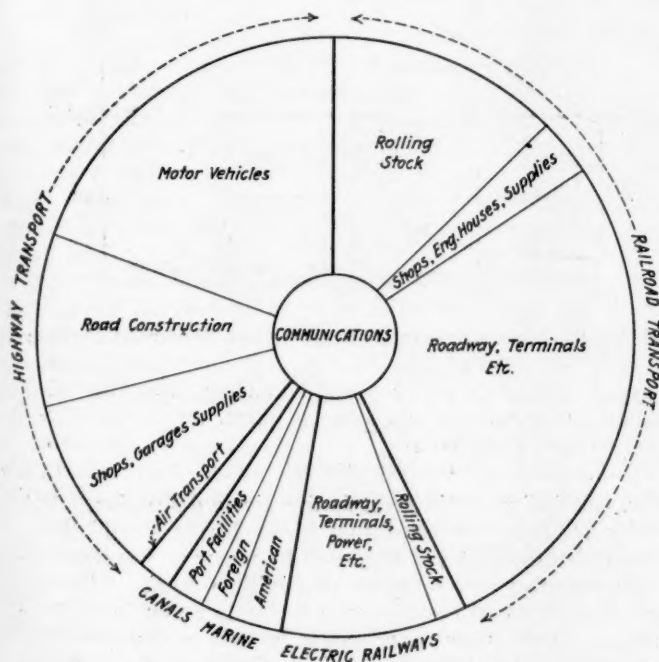
New York Railroad Club Told How Billions in Future Expenditures Can Be Saved

AT THE regular monthly meeting of the New York Railroad Club on March 16 J. Rowland Bibbins, formerly manager of the transportation department of the United States Chamber of Commerce and supervising engineer for the Arnold Company, Chicago, discussed the national transportation problem, taking into consideration the whole transport mechanism, including rail, shipping, barge, trolley, motor and air. He emphasized the necessity for co-

In the last decade motor transport commanded nearly four times as much new capital input as the railroads—nearly 16 billion dollars—while during the preceding decade ending 1910 the reverse was almost true—two billions for highways against six and a half billions for railroads. Thus during the last decade motor transport has called for over two-thirds of the new capital input of the whole transport system. The total transport investment today amounts to over \$500 for each of the 41 million wage earners of the United States, and nearly \$500 for every inhabitant.

50 Billions Needed for New Investments by 1940

Based upon past practice the speaker estimated that by 1940, at the very latest, 10 billions of new capital would be needed for railroads, and 15 billions more for the other carriers, assuming that the latter's services increased only as fast as the railroads. Another 25 billion would probably



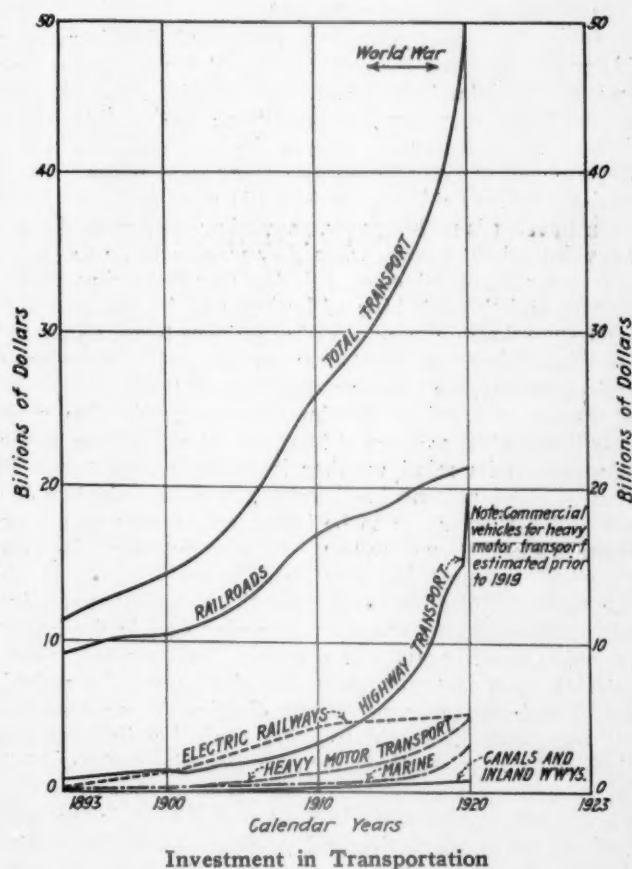
How the Nation's 50 Billion Dollar Transportation Investment Is Divided

ordination of these agencies rather than competition among them.

Tonnage Increases 2.6 Times as Fast as Population

Our national transport plant was found to have cost about 50 billion dollars, twice our present national debt. The discussion traced the history of these transportation systems since the Civil War, revealing a steady and consistent growth up to the present time, which gives a fair index of what the future holds. The basic rail tonnage, the best index, has been increasing in mathematical ratio about as the 2.6 power of the population, i.e., when our population doubles the tonnage has much more than quadrupled and the tonnage of nearly 4 billion tons is the indication for the year 1940, when our population will probably be around 130 millions. The fact was brought out that of recent years highway transport has developed much more rapidly than railroad transportation. Investments in transportation are being diverted in increasing proportion to highways and motor vehicles. The demand for transportation increases so rapidly, according to Mr. Bibbins, that if we could double the capacity of our present plant, it would last but 15 years.

Transportation is the second industry in the United States, second only to agriculture, in which the investment, 80 billions, exceeds manufacturing, in which 45 billions are invested.



be required for replacements, giving us a total of another 50 billions of expenditures necessary to keep up with the demands of our population.

Great emphasis was therefore laid upon the need of a new broad study of ways and means for welding all of these transportation services into a unit operation, i.e., to secure through transportation from producer to consumer. It costs as much to handle our tonnage to and from the railroads as it does to haul it between stations. Moreover, half of the railroad investment, or 10 billion dollars, has been spent in providing other than main line facilities. The terminal problem is thus one of the most important problems before the country,

perhaps second only to line consolidation. Collection and delivery in our cities was said to be the most important phase of the terminal problem.

"The public," said the speaker, "does not realize that practically all railroad freight other than coal, ore, etc., handled car-load direct, has to pass over our streets and highways one or more times, according to the number of fabrications involved in manufacture and sale. The question is whether it should be handled by vast fleets of unorganized, unstandardized, unregulated and partly loaded vehicles, or by a more scientific delivery system, efficiently financed, operated and scheduled." It was brought out that while package freight represents only four or five per cent of the country's tonnage, from 25 to 30 per cent of the railroad car equipment is required to handle it, due to various causes incident to expediting and merchandising this class of freight.

Industry Should Be Diffused—Not Concentrated

Mr. Bibbins emphasized the need of diffusion rather than increased concentration of industry which piles up a congestion in traffic which our cities are entirely unprepared to deal with. He also noted that one of the large problems of railroading was to finance the seasonal peak-load in the fall and during business booms. In ten months of 1922 the available railroad service swung from a surplus of nearly 500,000 cars to a shortage of nearly 180,000.

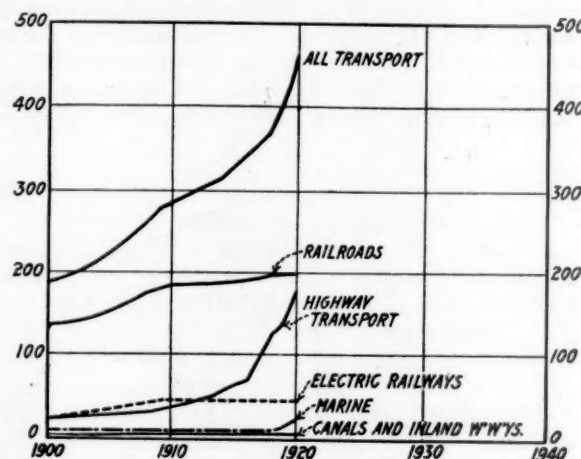
Co-ordination of rail, water, highway and electric railway facilities was declared the only open road for the future, for the waterways, inland and coastwise, offered a much cheaper investment and operation for handling some of this traffic peak-load, while the motor offered the best means of relief in the problem of distribution and short local hauls. Electric railways also held out considerable possibilities.

Co-ordination is nothing new, as carriers have unified their services throughout history when they wanted to do so—such things as standardized gage, belt lines and clearing yards, joint rates and through bills of lading, and in England and Canada store-door delivery. Today quicker turn-around for car or ship—more movement, less storage—will be the great capital saver and the proper motorizing of transport service thus becomes a possible interim measure to develop most quickly the capacity we need at least capital cost. The public must make up its mind whether it wants transportation to continue in the present inefficient manner or whether the streets and highways are to be brought into play as a new function in our national system. It must determine its own best interests—competition or co-ordination.

The speaker laid great stress upon the immediate necessity of metropolitan district transportation planning in the larger industrial districts, ports and gateways, and terminal planning based upon fact surveys so that the improved terminal system would merge properly into the larger metropolitan plan. Congestion is cumulative and confusion in transport regulations between small regional communities make unified action mandatory in the public good. The metropolitan district system of controlling civic development may, in the end, furnish the best alternative and practicable solution to the much controverted question of "home rule." In any event, district and terminal planning offers the maximum possibilities of quick civic betterment. These surveys should cover streets and highways, transit, traffic, railroad passenger and freight terminals, city delivery, port and barge terminals, warehousing, grade separation, industrial expansion and zoning, air ports and air-ways, financial and legislative programs and the relation to the general city plan governing other matters of civic welfare.

Land values, he pointed out, offer our greatest future hope for in large centers the assessed value of land increases mathematically about as the 1.7 power of the population, in some cases as high as the second power, as in New York. This means that the purchasing power of our cities for public im-

provements properly planned quadruples automatically as the population doubles. And this is also a tremendous asset for the carriers who are thereby enabled to realize upon their great assets in down-town terminal properties which can now be devoted to more useful purposes either by sale of "air rights" or by setting back their terminal operations on cheaper property and using contract motor delivery for reaching all parts of the continually expanding business districts. In efficient co-ordination, the speaker claimed, rested the greatest hope of increasing quickly our national transportation facilities to



Per Capita Investment in Transportation Shown in Dollars

meet the onward march of tonnage which is constantly running ahead of the facilities now available.

Discussion

Mr. Bibbins' paper brought forth a lively discussion. Col. Charles D. Hine suggested that the railroads should themselves undertake highway transport by motor and systematize it to supplement and serve as an auxiliary to the railroads. The railroads could then exercise their discretion in the case of any given shipment, handling it by rail or motor, whichever would be the more economical. By common ownership and management of both highway and railway facilities the public could be assured that the most economical method would be used.

Willard Chevalier, of the Engineering News-Record, said that railway officers now had to spend so much time at hearings before commissions and in preparing data for hearings that with the duties of operating their properties efficiently they had little time for preparing and discussing comprehensive plans for future developments. Under these circumstances, he suggested that the work of planning for the future must be undertaken by those who are equipped to do the work and, at the same time, can give their time to it. He urged the founding of a national institute to further the study and development of plans for future development.

J. Shirley Eaton said that the railroads were now before the law looked upon as forming a national transportation system and not as individual companies acting for all practical purposes independently. He cited the decision in the New England divisions case as bearing out this view.

D. L. Turner, chief engineer of the Transit Commission of New York, spoke of the excessive expenditures made necessary for terminal and transit facilities by the congregation of people in large cities. He expressed the opinion that city dwellers did not pay for these expenditures themselves but taxed the whole country for them. In his opinion the situation could be remedied if the costs of development were charged against the city-dwellers. City life would then become so expensive that it would be unattractive to many and the tendency toward congestion would diminish.

Dr. Hadley on the General Railroad Situation*

Succinct Review, Covering a Third of a Century—Need of a Commission of Railroad Experts

ARTHUR T. HADLEY, President Emeritus of Yale University, is the author of an article, "Factors in the Railroad Situation," in the Yale Review for April, an abstract of which follows:

The railroad is not an ordinary private business; it is a vast public agency. It is never in satisfactory condition unless it has the superabundance of power which is needed for meeting public expectations in an emergency. For the handling of our immense long distance traffic, and the making of rates which will enable the producer to market at a profit, we depend upon the railroad. Steamships and barges can take care of our goods upon some routes; but not upon many. Automobiles can carry a part of them for short distances; but the physical volume of the transportation which they can handle is only a small fraction of the whole. Even if we had enough machines and enough good roads for the purpose, we could not get gasoline enough. For an industry to be really prosperous which carries such obligations, something more is needed than a satisfactory income account for the past year or current budget for the next. It must be in a position to meet all reasonable public demands and perhaps some unreasonable ones.

To be in a really sound condition a great railroad system like ours must in the first place have abundance of appliances for handling traffic; not simply cars enough to meet the average demand. In the second place, there must be loyalty and discipline among the railroad employees. Either individually or through their organizations, they must be co-operating with the owners in maintaining continuous service at reasonable rates. They must accept the same kind of obligations towards the public that are imposed on railroad investors or managers, and not permit themselves to make public inconvenience a source of private gain. In the third place, railroad owners must have the chance of profit which goes with the assumption of special burdens or hazards, and railroad managers must be given the kind of freedom and recognition which is accorded to men who carry responsibility.

In none of these respects can present conditions be called satisfactory. Complaints of car shortage are frequent; complaints of locomotive shortage, particularly in winter, are still more frequent. Passenger trains fail to run on time; freight deliveries are impeded by congestion or indefinitely postponed by embargoes. The labor situation is no better than the equipment situation. Large sections of the employees fail to recognize their public responsibility at all. The progressive railroad manager who wishes to experiment with new means of developing or handling traffic receives scant encouragement. He has to take days of time in explaining to commissions which have a natural distrust of experiments devised by any experts except their own. Forty years ago, railroad administration was an attractive career to men of independent power. Today the chances for independence are so curtailed that the career is ceasing to attract a sufficient number of young men of the first rank. It has been made a jail offense for a railroad man to try to know more about the economy of his business than the Interstate Commerce Commission thinks is good for him. The law says: * * * "Any person who * * * shall keep any other accounts, records, or memoranda than those prescribed or approved by the commission shall be deemed guilty of a

misdemeanor, and subject * * * to a fine of not less than \$1,000 nor more than \$5,000, or imprisonment for not less than one year nor more than three years."

Under circumstances like these, few people want to put their money into railroad stock. We must not be deceived by names. It will not do to say, "Railroad bonds are an investment just as much as railroad stock." If a merchant extends his business by borrowing, and owns no larger margin of property above debt at the end of the year than he did at the beginning, we shake our heads. If the whole increase of farm values in any district is swallowed up by an increase of farm mortgages, we recognize that farming is in a precarious condition. [The author here reviews the history of our railroad system from 1879, noticing particularly the influence of Albert Fink and Charles Francis Adams, and noting the deficiencies of the Esch-Cummins Act of 1920, with remedies.]

Government ownership is one proposed remedy. But this, in the three years from 1917 to 1920 was so unsatisfactory that it would be folly to try the experiment over again, until our government departments have reached a higher level of business sagacity and freedom from political control, or until the taxes already collected by our government are more wisely adjusted and more economically spent. And if the government is not to operate the roads, very little good could come from having it own them.

A second group desires to have railroads controlled as far as possible by the employees themselves. * * * If at the end of the year there was a surplus it would be divided between the laborers and the public; if there was a deficit, the public would pay it all. But any such arrangement as that makes the laborers urge their representatives to fix wages too high for good railroad economy; and to resist such pressure the leaders have to be not only very wise, but also very sure of their power. The events of 1922 in connection with the shopmen's strike make it clear that the wiser heads among our railroad labor leaders are not so sure of their power as would be desirable for them and for the country. The attempt to solve our railroad problems by giving organized labor a large share in railroad control seems even less advisable than a direct resort to government management.

There is a third way open to us: to treat railroad business as nearly as possible in the same way that we treat other kinds of business. If we attempted to regulate banks by two independent commissions, one of which should fix the rates of discount which they could charge the borrowers while the other determined the rates of interest which they must pay their depositors, everybody would see that this was a dangerous system; yet this is precisely what we do in regard to our railroads. Every business man knows that rates and wages must move hand in hand. If the prices which a manufacturer can get are controlled by a board which looks chiefly at the needs of his customers, and the wages which he must pay by a board which looks primarily at the requirements of his laborers, the margin between receipts and expenses gets too small to attract into the business the capital necessary for paying the laborers and producing the goods. This is just what is happening in railroad business today; and the first step out is to put the oversight of both rates and wages into the hands of one board, which can be held responsible for results. With centralized regulation of this kind, we may hope to secure adequate facilities, continuous

*Dr. Hadley was the author of "Railroad Transportation. Its History and Its Laws," 1885; and in 1910-11 was chairman of the Railroad Securities Commission appointed by President Taft.

service, and reasonable rates; without it we are bound to pursue each one by turns, to the neglect or sacrifice of the others, and to make the railroads the less fitted to serve the public the more we try to regulate them.

Such a board can produce results in two ways: by the publicity of its findings, and by the authority which the law may give it to enforce its decisions. How much authority should be given is an open question. It depends somewhat upon the personnel of the board. With a man like Charles Francis Adams [who represented the public so admirably in 1869-1879] as chairman, no authority at all was necessary; he put things so clearly that what he said went. He got the public behind him at once. But this was an exceptional case, and it may be taken for granted that any national railroad board today would be given some powers beyond the power to report. The all-important thing is that any authority which the board has should extend equally over the representatives of the stockholders and the representatives of the laborers. Anything in the Clayton Act or in the anti-trust legislation of the United States which allows one group of men or their leaders to do things with impunity which could result in fine or imprisonment for members of another group, must be swept away. Removal of such special legislation from the statute book is not only necessary to enable the board to protect the public; it should also, in the long run, help the conservative men among the laborers themselves. For any law which exempts one class of men from penalties for its violation, encourages the more reckless members of that class to take advantage of this immunity, to the detriment of public convenience and often of public order.

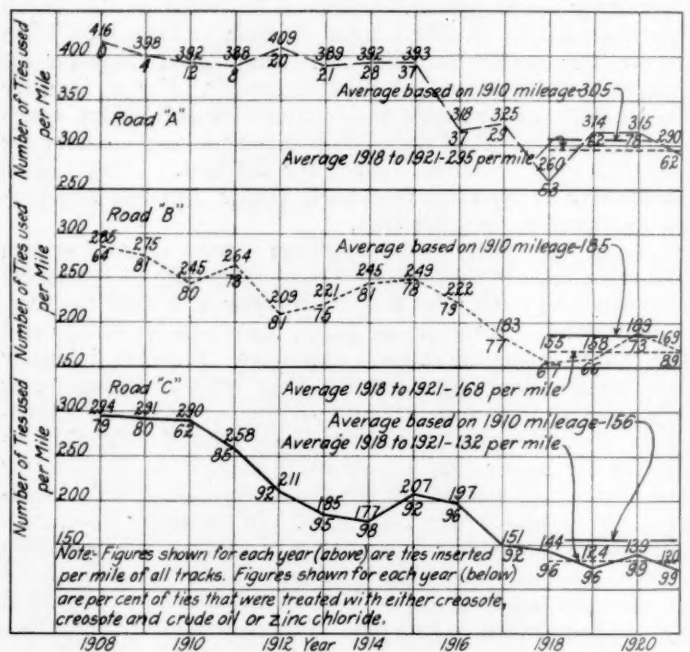
To work effectively, a railroad board of the kind proposed would have to be radically different in its character, its outlook, and its training from what the Interstate Commerce Commission now is. This is not intended as a criticism of the members of the commission, who are a remarkably high-minded, hard-working, and patriotic body of public officials. It is simply a recognition of the fact that the things which most need to be done today to restore our railroads to the condition of efficiency which they enjoyed 15 years ago are those which the Interstate Commerce Commission has not done, and which most of its members have not been trained to do. From the very beginning, the commission has been overworked. The number of complaints of freight rates, etc., has been so great that the commission is given scant time for the fulfilment of its broader obligations; particularly as few of its members have had practical experience of the difficulties and perils of railroad management.

A group of men who are largely occupied in looking at rate questions *ex parte* from the standpoint of individuals, and who have not as a rule had previous training in railroad administration or economics, is obviously not fitted to deal with a situation like that which confronts us. As an adjunct to our commerce courts it [the present commission] can continue to do great service. But to supervise our railroad policy as a whole, we need a body of quite another stamp. To prevent the public interest from being sacrificed to the immediate demands of groups of shippers or laborers or bankers, we must have a body of men with exceptional previous knowledge and understanding of railroad business in its various aspects; men who can see the public duties and needs and dangers of our railroad system as a whole in the same clear light in which the Federal Reserve Board has seen the public duties and needs and dangers of our banking system. We should give railroad managers the same chance that we give managers in every other line of business which has large and complex public obligations—the chance of dealing with government officials who before their appointment have had either actual experience in the conduct of the business or special knowledge of the circumstances under which it is conducted. Thus and thus only can we maintain the efficiency and solvency of our transportation system on the same high level as that of our credit system.

Demonstrating the Economy of Timber Treatment

NO SINGLE FACTOR has done more to retard the treatment of ties than the fact that the results are apparent only after the normal life of the timber untreated is reached. However, the fact that this practice is productive of large economies after this period has been exceeded is shown in a striking manner in the chart on which are platted the number of ties inserted per mile of all tracks on three large railway systems for a period of 13 years ending with 1921, together with the number inserted per mile on the basis of the mileage in operation in 1910, the latter figure taking into consideration the increase in mileage since that date.

Road A did not start the use of treated ties until 1909 and the proportion of treated ties used did not exceed 37 per cent in any year until 1918 and has exceeded 62 per cent only in one year. As a result, this road has as yet



Curve of Tie Renewals on Three Roads, Showing Effect of Treatment

secured only limited benefit from treatment, the average number of ties renewed per mile during the four years from 1918 to 1921, inclusive, being 295 or 305 if computed on the basis of the mileage operated in 1910.

Road B has advanced further in the treatment of ties. It had a few zinc treated ties in service prior to 1908 and at no time since that year have less than 64 per cent of its ties been treated. As a result its requirements for renewals have shown an almost constant decline from an average of 262 for the four years from 1908 to 1911 to 168 in the corresponding period from 1918 to 1921, or 185 per mile based on 1910 mileage.

Road C has been a pioneer in the treatment of ties, having used them to some extent since 1888 and not less than 92 per cent since 1912. As a result, its renewals have dropped from an average of 292 for the three years from 1908 to 1910 to an average of 132 for the four years from 1918 to 1921, or 156 per mile based on 1910 mileage. In other words, by the constant use of treated ties, the requirements of Road C have been reduced to half of those of Road A which has only recently gone to the use of treated ties. This is a striking demonstration of the economy of timber treatment over a long period of years.

Success of Institute of Transport in Britian

Rapid Progress in Few Years of Existence—High Standards for Membership a Help

By W. H. Fraser, A. M. Inst. T.

THE proposal to establish a national transportation institute in the United States has attracted attention in Great Britain, and it may be of interest to describe the steps taken to form a similar institute in England, its aims and objects and the measure of success it has achieved. The Institute of Transport of Great Britain is still in its infancy, though it is a decidedly healthy youngster, and its slow but steady growth gives promise of its ranking with the best professional institutions in Great Britain and its becoming an organization which will be a recognized asset to the community.

The Institute of Transport owes its inception to a suggestion published in the editorial columns of the publication *Modern Transport*, in May, 1919, which at once received unqualified support from leading men in all branches of transport. Practical steps were quickly taken by holding a conference at which a sub-committee was formed to draft a plan and the Institute was formally inaugurated in the following November. The first president was Sir Eric Geddes, Minister of Transport, and during his term of office the Institute was incorporated in August, 1920.

The Membership of the Institute

The Institute consists of members, associate members, graduates, students and honorary members. The principal qualification for full membership is that applicants must be at least 30 years of age and "shall have had at least 10 years official responsibility in dealing with traffic or providing transport or works connected therewith." In practice, the leading men of the transport world have become members at the invitation of the council (the Institute's governing body), but future invitations will be rare, as a large number of the present members will in course of time become managers of the various transport organizations.

Associate members must have had five years official responsibility in transportation matters, and be not less than 25 years of age. The minimum age for graduates is 23 years, and students 18 years, and they are required to produce satisfactory evidence of having either attained a well-defined educational standard or to pass the examinations of the Institute. The entrance fees are from three guineas downward and annual subscriptions on the same basis.

A membership committee of the council examines applications for admission to the Institute and though the committee is fairly constituted it occasionally happens that an applicant is dissatisfied with the grade of membership allowed him. It would probably strengthen the confidence of a potential member if a new rule could be made that his claims should be considered only when the representative of his branch of transport was present at the meeting of the membership committee. The committee requires a high standard for membership and rigidly adheres to the regulations laid down by the council for its guidance.

The following table shows the membership of the Institute at the conclusion of the first, second and third years, respectively:

	1919-20	1920-21	1921-22
Members	294	472	519
Associate members	282	258	307
Graduates	45	234	359
Students	31	117	133
	652	1,081	1,318

Administration

The Institute is administered by a council of thirty members and the officers, who comprise a president, three past presidents, three vice-presidents, and a treasurer. The chairman and past chairman of provincial (i.e. outside of London) sections also have a seat on the council. All the officers and members of the council give their services without remuneration. The council has the services of an honorary legal adviser and an honorary secretary. Since the inauguration of the Institute the secretarial work has been undertaken in an honorary capacity by H. E. Blain of the London Underground Railways. The many tributes to his organizing ability are fully justified, but the growth of the Institute will in time probably render it necessary for the engagement of a professional secretary to carry on the work. The constitution of the Institute provides for this, and he will be the only salaried officer.

Elections to the council are by the ballot of members and associate members. Not less than six members of the council must retire each year. By this system the organization is controlled by the members and associate members who, however, invest the councillors during their term of office with complete powers for carrying on the business of the Institute. The council appoints the officers, administers the finances, forms committees, arranges publication of papers and documents, examines papers for lecture and debates and carries out the hundred and one functions associated with the Institute with the help of its clerical staff. Precise particulars of its powers and duties are supplied to every member of the Institute.

The Work of the Institute

The active life of the Institute covers the period between October and May, and opens with the annual meeting and presidential address. Monthly meetings are held in London, at which papers are read and are followed by discussions participated in by recognized experts. The council has so far been fortunate in securing generous support from the leading authorities in the various phases of transport, and there is no sign of a dearth of subjects for papers or lectures or of front rank men who are willing to give their time in reading them. In addition to the papers read at the ordinary meetings, which take place at the lecture halls of other institutions, there are monthly lectures voluntarily undertaken by the principal members of the Institute.

London has its graduate and student society with a member of the council as its chairman. Monthly meetings are held at which not only members of the Institute give their services in reading papers, but in which the graduates and students as well are encouraged to participate.

A local section of the Institute has been established in the Manchester district and others in other sections of the country are in process of formation.

The papers and lectures cover a wide range of subjects in every sphere of transport, and the council allows the authors perfect freedom in expressing their views on matters on which diverse opinions are held by members of the Institute. During the past session papers on the subjects enumerated below have been read and discussed:

Possibilities of improving train loads;
The future of British railways;

Transport law;
Development of commercial airways;
Railway problems in China and Australia;
The relation of civil engineering to transport problems;
Recent improvements in equipment for electric traction on railways, making for economy, &c., &c.

The Annual Congress

An annual congress is held each year. In 1921 Manchester was selected as the congress' headquarters. Last year it was held in London. Arrangements are now being made for the holding of the third annual congress in Sheffield. The success of these congresses is indicated by the attention given to them by the daily and weekly press which devote considerable space to reports of the proceedings. One paper, "The Finance of the Modern Highway—a Problem and a Solution," by Dixon H. Davies, then solicitor of the Great Central Railway, aroused widespread interest and there is reason to believe that it will have its influence on forthcoming legislation. This paper was reported in the *Railway Age*.

The importance of the social side of these congresses is not overlooked by the council. The delegates to the London congress were received by the Lord Mayor of London. The occasion was marked by the holding of the annual dinner, when the chair was occupied by the president, Sir Henry Maybury, Director General of Roads, Ministry of Transport, who was supported by the Secretary of State for Home Affairs, and other distinguished guests. The program of social functions included a large number of visits to places of interest to transport men.

Awards

For the best contribution to the proceedings the Institute awards a gold medal triennially and to graduates and students two silver medals annually. For their respective branches of transport the railway companies annually award two gold medals; road transport associations, two gold medals; water transport and dock interests, two gold medals. Aerial transport is represented by one gold medal. An offer has also been accepted from the Canal Association for the award of a gold medal biennially on a subject relating to inland water transport. The publication, *Modern Transport*, presents annually a money premium for a paper by a graduate or student.

Finance

The expenses of the Institute for the last financial year amounted to roughly £2,800 and were liquidated by the subscriptions received and interest on investments. The capital of the Institute is about £2,000 and the council has not had occasion to draw upon its capital account for forming the Institute except to a very slight extent. The financial statement of the Institute presents figures which are trifling when compared with the amount of \$250,000 for the proposed annual expenditure of the American institute.

Objects of the Institute

Sir George Gibb has concisely described the objects of the Institute as the "collective and organized effort to widen the boundaries of knowledge in the sphere of transport, and to extend the application of methods of science." At greater length the three principal objects of the Institute are set out in its memorandum of association:

(a) To promote and encourage knowledge of traffic science and of the art of transport in all its branches, and the means and appliances connected therewith; to provide facilities for the study of and exchange of information and ideas on traffic problems and all means and methods of transport; and to raise the status of those engaged in traffic and transport.

(b) To hold meetings of the Institute for reading and discussing communications bearing upon traffic and transport and methods or subjects relating thereto.

(c) To provide for the delivery of lectures, the holding of classes and examinations, the awarding of certificates, medals, scholarships and diplomas in connection with traffic and transport.

It is a transport Institute for transport men, and the plan of the organizers is to dig the foundations deeply so that by study and the interchange of ideas the complex problems of transport may be tackled by men with a sound knowledge of the science of transportation. It is a building-up process in which the men who know are communicating to their juniors, and not infrequently to their contemporaries, knowledge which in the past has been difficult to acquire, through the traditional conservatism of the Englishman. It should be emphasized that it is the actual directors of all branches of transport who are engaged in this educational work; sound, practical men who have won their positions by sheer ability. Their experiences, conveyed through the medium of the lecture room or in debate are preserved by the printed records of the society and circulated among the members for study and reference. The Institute has been the means of sweeping away the old bad habits of pigeonholing valuable information. It is creating a new interest in transport, and is helping the men who in the future will have charge of the country's transport.

Facts to Combat Attacks

Scientific study will tend to effect improvements that will systematically crumple up the attacks which transport men invariably have to face. It speaks well for the Institute and for future co-ordination that representatives of rival branches of transport can sit side by side on the council and discuss their problems in a friendly manner and without bitterness of feeling. It has raised the science of transport to a higher level and should continue to do so.

A Comparison With the American Plan

The American plan differs fundamentally from the English Institute inasmuch as it is proposed to include representation of business interests outside the transport world. To English transport experts the scientific study of transport problems would appear to suffer by this method. The English Institute does not include in its aims publicity campaigns to educate the public and "nail the lies" as an American has tersely put it. That work is done when required by the publicity organizations of the various interests. The Institute gains favorable publicity by the dissemination of reports on its lectures and in that and other ways is removing misunderstanding on the part of the public.

Beyond the infant maladies associated with the growth of similar institutions the Institute has not had any serious troubles to overcome. There is a sub-conscious feeling that the men who are directing the business of the Institute have the ability and willingness to ensure its prosperity. The one dark cloud is the slowness with which the numbers of the members increase having regard to the thousands of men engaged in transport work.

It is one of the trials of new institutions that the first wave of enthusiasm is followed by a period of apathy and the experience of the English Institute in this respect will help American friends to be on their guard should a similar trouble arise.

THE ST. LOUIS SOUTHWESTERN has secured a reduction in assessments levied by Road Improvement District No. 5, Arkansas County, Ark., from \$76,000 to \$10,000 in a decision handed down by Judge Jacob Trieber of the United States District Court at Little Rock, Ark. When the first assessment was made in the district the railroad agreed to an assessment of \$10,000. A reassessment was later made and the amount was raised to \$100,000. The railroad protested and the commissioners reduced it to \$76,000. The railroad then filed an appeal in the Arkansas County Chancery Court and later transferred it to the United States District Court. The case involved the assessment of the road's Gillette branch which the highway parallels for nearly the entire distance, passing through Stuttgart, Almyra, DeWitt and Gillette.

Engine Terminal Development—Fourteen Points*

Rapid Development of the Locomotive Puts Increased Burden on the Designer of Facilities

By W. T. Krausch

Engineer of Buildings, Chicago, Burlington & Quincy, Chicago

THE DEVELOPMENT of the locomotive in recent years has been very marked. On the other hand many of our locomotive terminals were built before the heavy power now in use was even thought of. With this fact confronting us, I feel that we should first consider what improvements and results will be obtained by reconstructing the older locomotive terminals. Where this can be done, I believe we will produce quicker and more far-reaching general results and, in many cases, at a moderate cost. Of course, where the facilities are such that proper redesign can not be carried out the new terminal is the only remedy.

The remodeling and improving of older terminals should be carried out to obtain greater flexibility; to afford more leads to and from the roundhouse; to secure modern cinder, coal, water and sand plants; to provide turntables of right size with electric tractors; shop facilities equipped with modern machinery; and roundhouses with overhead cranes, jib cranes and drop pit installations; and to afford modern power plants. One important factor is to consider that the operations are conducted 24 hours a day and that night work is more inefficient and calls for adequate electric light, properly distributed. There are many other things that can be done to bring about better results in an old terminal. These include (1) additional track facilities with leads to and from roundhouses; (2) good washout facilities; (3) drop pits; (4) modern cinder pits; (5) adequate water service; (6) modern coal and sand plants; (7) good drainage; (8) proper ventilation; (9) effective heating installation; (10) modern artificial lighting, both inside and outside; (11) adequate day lighting of buildings; (12) proper maintenance; (13) machine tool installations, and (14) power plant improvements.

The New Terminal

The first problem with the new locomotive terminal is to determine its location on the line. It is then necessary to select the local site, after which the number of locomotives and the various kinds to be handled must be determined, as well as the schedule under which they are to operate. One of the first and most vital matters is drainage as affected by the topographic conditions.

The terminal must be designed to allow future growth and possible improvement in the various units as well as advancement in the art. Track facilities must be adequate, providing sufficient leads, switches and crossovers to and from the roundhouse and its serving units, to avoid delay at the coal plant, cinder pit, water cranes, inspection pit or other accessories. We will now consider the various features of the terminal.

The inspection pit is really the entrance or beginning. Here the roundhouse foreman is forewarned of the work required and will arrange accordingly. If crews are released here, it is the proper location for locker, wash and toilet room for crews, as well as the inspector's office.

Too much can not be said about the cinder pit. Locomotives of the larger types will dump as high as four cubic yards of cinders. The cleaning will require 30 to 45

minutes and if engines arrive in fleets there will be delays.

The coaling station must be of modern mechanical design, constructed of suitable material, with good coal handling equipment to insure long life, low maintenance and low operating cost. It should have adequate storage capacity with mechanical elevators, or hoists, of sufficient hourly capacity to insure an ample supply and the prompt release of cars. The receiving hopper must be of ample length and width to insure the handling of a complete car and provide sufficient room for the unloading and handling of the coal. This hopper should be properly enclosed in order to protect the men from the elements and extreme weather and increase their efficiency.

The coal storage bins should be made self-cleaning as nearly as practicable by proper slopes of the floors and rounding of the valleys. The outlet fixtures should be preferably of the over cut type to insure proper mixing of the coal delivered to the tender. It is also necessary to design the plant so that the various bins can be cleaned.

Fire protection should be provided when necessary. In lignite territory it is undoubtedly preferable, on account of the possible firing of the coal, to construct the plant of steel or reinforced concrete, or to line the pockets with reinforced concrete.

The sand plant at the average large terminal should be equipped with a modern steam drier with ample storage space for both green and dry sand. In some cases it is advisable to centralize the drying of sand at a given terminal and ship the dry sand to the outlying districts.

Too much can not be said about an adequate supply of suitable water and an effective distribution system with crane installations for the outbound and inbound leads. Water for locomotive service, as well as for the power plant, must be the best possible in all cases. The better the quality of water, the more perfect the results.

The turntable must be of adequate size and capacity to handle the locomotives and should be electrically operated where practical. Usually only one turntable is provided for an enginehouse, regardless of the number of locomotives housed, but the need for additional tables must be carefully considered in the light of the number of engines handled.

Local Conditions Determine Roundhouse Design

The design of the enginehouse and number of stalls depend on local conditions and the kind and number of locomotives turned. Ample room must be allowed in front and back of the locomotives for the necessary work and the handling of materials. The pits must be of sufficient length and drain properly to the inner circle. The roof should be sufficiently high to provide proper clearance, ventilation and the installation of any mechanical appliances that will aid in the handling of the various parts of a locomotive. The walls should be provided with ample window areas, not only at the outer circle but also at the inner circle or in the monitor.

The heating, preferably, should be of the indirect system with from three to four air changes per hour and insure a temperature of from 50 to 60 deg. F. Smoke jacks are usually made of cast iron or asbestos board. The smoke jack is something that requires improvement. One effort in

*This is the third of a series of papers on engine terminal design presented before the Western Society of Engineers, Chicago, on March 13. The other two papers, by L. K. Silcox and R. N. Begien, respectively, were published in the *Railway Age* of March 17, page 759.

this direction is the installation of the smoke exhaust system.

Floors may be of various kinds, but should be of a permanent character such as concrete or brick. A good floor facilitates the trucking of locomotive parts and materials.

The number of drop pits depends entirely on the purpose for which the particular house is used and the class of power handled. In ordinary cases a double drop pit for the drivers, together with drop pits for the engine truck, trailer and tender wheels should be provided. A traveling crane of ample capacity around the entire circle and jib cranes for cylinder work and rod handling are of advantage.

Adequate lighting properly placed, with extension cords for work inside of the fire boxes, etc., is a matter of necessity. Too much stress can not be placed on this important item in connection with all units entering into a locomotive terminal improvement.

A hot water washing and filling plant is a tremendous asset. It reduces the time required for blowing down, washing and filling, and conserves the water and steam. It is more economical than the cold-water system and does away with a great deal of flue trouble.

Oil and Stores

The storehouse and its facilities should be centrally located and preferably close to the roundhouse and shop. The walls should have an abundance of windows and the general arrangement designed in a manner to provide for the handling of the material to and from its point of distribution in an economical and practical manner. This means proper roadways, platforms and racks.

The oil house, in a great many cases, is located adjacent to the storehouse and must be provided with proper facilities and installation to store and handle economically the various oils, waste, grease, etc., required in the terminal. The store and oil houses and their contents in most cases represent large investments and warrant fireproof construction.

Provide a Modern Power Plant

The size and cost of the power plant in many cases is determined by the possible cost of purchased current. Local electric current may often be purchased at less cost than it can be generated. Where the requirements are sufficiently large water tube boilers, stoker fired, equipped with coal and ash handling equipment, should be provided. A permanent stack for natural draft is a paying investment. Feed water heaters, with the various pumps, are absolute necessities. The entire plant must be carefully considered from the standpoint of possible growth.

Other Factors Influence the Design

The foregoing illustrates and defines the units considered in the locomotive terminal insofar as their general co-ordination and effect are concerned. There are, however, other problems to contend with.

In arid climates, timber construction can be considered for certain work which would not be allowable in humid sections. The elevation above sea level enters into the problem from the standpoint of power, draught, air-compressor capacity, etc. In certain sections, the facing of the inner circle of a roundhouse to the north, or to a particular direction of the wind, would be very objectionable. The same conditions influence the kind of windows and doors to be used. The facing of the building with reference to the proper light should also be considered.

The summer months give an average of 16 hours of daylight in the 24, while the winter months give an average of only 10½ hours of daylight. This shows the importance of good artificial lighting. Consider the problem on the basis of 24-hour operation. The shift of preference is the daylight shift and commences at seven or eight o'clock in the morning, which means that we must perfect the remainder of the day

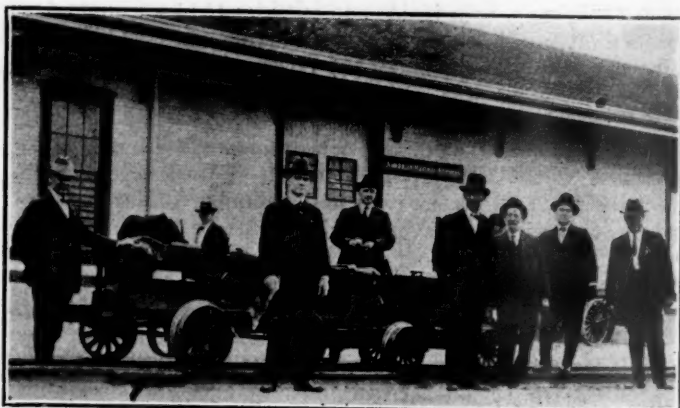
to make it nearly as acceptable as the preferred shift. This can only be done by the installation of: (1) Good artificial light both inside or out; (2) the housing of units, which will bring results in the winter months; (3) installation of the right kind of heating and ventilation; (4) proper facilities and housing for the men employed in the various units entering into the work.

The kind and quality of materials required in the construction of the various units are a most important factor. Each unit must be considered individually, the class of material used in its construction must be properly defined and selected, and at the same time the market from which they are to be purchased must be considered, based on the location of the plant.

The power plant equipment, appliances, piping, etc., must be carefully considered and the life of the materials, appliances, machinery and equipment is one of the essential factors entering into a development of this character. For example, if the steam piping in a roundhouse gives out in three or four years, it indicates poor selection. If there are breakdowns and failures in the machinery equipment or power, it means serious delays, expense and inefficiency, and, further takes away from the master mechanic the very class of talent required to produce results in turning power.

General Manager Meets Shippers Annually

ONE OF THE WAYS in which the Gulf, Colorado & Santa Fe promotes cordial relations with its patrons is through the annual inspection trip which F. G. Pettibone, vice-president and general manager, makes over every mile of the company's lines. The inspection party, which includes Mr. Pettibone, the assistant general manager, the safety supervisor and the various division superintendents, division



General Manager's Inspection Party on Gulf, Colorado & Santa Fe

engineers and division freight agents of the divisions which are visited, stops at every station regardless of its size and calls are made upon all shippers. The entire trip is made in section motor cars, so that prolonged visits can be made wherever necessary. From 3,000 to 4,000 miles of lines are covered by the party and some 3,000 shippers are enabled to meet and discuss their problems with the chief operating officer of their freight carrier. In addition to meeting the shippers, Mr. Pettibone is able personally to inspect every section of the railroad itself and to meet the section foremen, agents and other employees. The photograph, taken last December, shows the inspection party at Killeen, Tex.

Willamette Geared Locomotives

A NEW INDUSTRY has been inaugurated on the Pacific Coast by the undertaking of the Willamette Iron & Steel Works, Portland, Oregon, of the manufacture of geared locomotives for logging purposes. Heretofore no locomotives had been built in the far west. The Pacific Coast logging companies consequently had been dependent on manufacturers in the east, which made it difficult to secure quick delivery of repair parts.

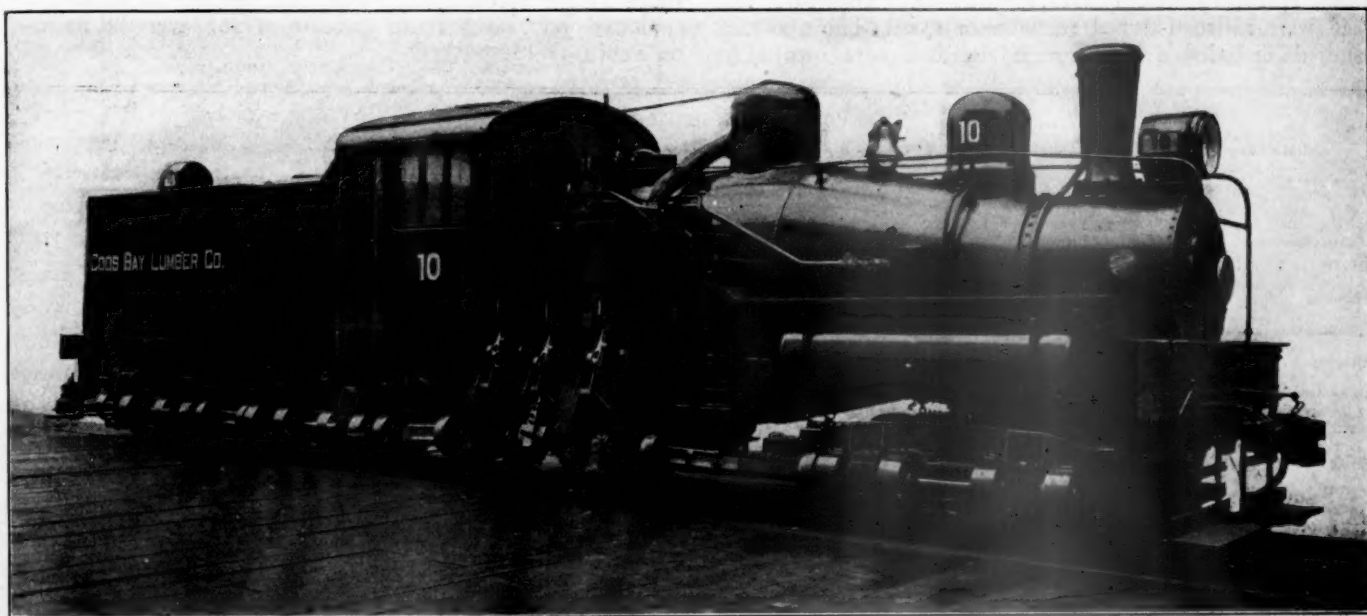
Since the building of their new plant The Willamette Iron & Steel Works has given considerable study to locomotive construction, with the result that they have recently completed their first machine. This locomotive was purchased by The Coos Bay Lumber Company, Marshfield, Oregon, and was delivered in November, 1922.

Many details have been incorporated in its design as the

gear, the Walschaert type having been adopted. This eliminates half the number of eccentrics, permits of more convenient arrangement of the cylinders and renders the steam chest openings and valves more accessible. The general construction of the trucks with provision for the take-up for wear and accessibility for inspection have been especially considered in the design.

Included in the standard equipment is an all-steel cab, electric head and cab lights, air brake, and oil burner equipment. Where it is desirable to use other fuel than oil, suitable provision can be made for coal or wood. The locomotive as at present constructed with a capacity of 4,000 gal. of water and 1,500 gal. of oil weighs approximately 180,000 lb.

The Willamette company's present program includes the production of one locomotive per month beginning in January, 1923. Other purchasers beside the Coos Bay Lumber Company are the Monroe Logging Company, Everett, Wash-



Geared Locomotive Built by the Willamette Iron & Steel Works, Portland, Oregon

result of suggestions of master mechanics and loggers in the most important camps of Oregon, Washington and California. A thorough survey was made of the field and difficulties being encountered were carefully studied. The practical suggestions of users have been incorporated wherever possible.

The locomotive is a complete Willamette product in that all of the important elements were built in their shops. The frame, trucks, tanks, cab and boiler were built in the boiler department, the engine and driving mechanism in the logging engine department and the whole assembled in the logging engine department. An addition to the present plant is contemplated, however, with suitable tracks and crane facilities to be devoted exclusively to the erection of locomotives.

Although no active plans have been made for the construction of direct connected engines it is the intention as part of the future developments to build such locomotives also. It is, furthermore, the expectation that a considerable amount of locomotive repair work and re-building will be done in the future.

The general appearance of the Willamette geared locomotive design is indicated in the photograph. The side drive has been adopted in preference to the center shaft drive. The three-cylinder, vertical engine is capable of developing approximately 900 hp. The boiler carries a working pressure of 200 lb. and is built in strict accordance with the requirements of the A. S. M. E. code.

One of the noticeable features of the design is the valve

ington; the Beaver Creek Logging Company, Portland; and the Edward Rutledge Timber Co., Coeur D'Alene, Id.

Freight Car Loading

WASHINGTON, D. C.

FREIGHT CAR LOADING during the week ended March 10 dropped back a little as compared with the remarkable figures of the previous week to a total of 905,219 cars but was still far in excess of previous records for this season of the year. As compared with the corresponding week of last year the increase was 84,333 and as compared with 1921 it was 204,779. Grain and grain products, coal and merchandise, l. c. l., were below last year's figures but there were large increases in other items, including an increase over last year of 24,707 in forest products and 70,264 in miscellaneous freight.

The freight car shortage dropped slightly during the week ended March 7, to 79,279 cars, or 1,363 less than the average for the preceding week. This included 36,202 box cars, an increase of 2,345, and 34,642 coal cars, a decrease of 4,129. There were also surpluses amounting to 13,229.

Heaviest Tonnage for January

Freight traffic on American railroads in January this year was the heaviest for that month in history, according to re-

ports received by the Bureau of Railway Economics, with a total of 37,668,368,000 net ton-miles. This had been exceeded in only two months in 1922, both of which were in the fall when freight traffic is always at the peak for the year. The total for January exceeded the same month in 1922 by 10,517,623,000 net ton-miles, or an increase of 38.7 per cent.

From January 1, 1923 to March 1, 25,866 new freight cars were placed in actual service on the railroads, while orders calling for the delivery of 102,912 additional cars have been placed, according to reports filed with the Car Service Division. More new equipment is now on order than ever before at this time of year in the history of the railroads. From January 1 to March 1 last, the railroads also placed in service 589 new locomotives, while on March 1 reports showed 1,945 new locomotives on order with deliveries being made daily.

Of the 25,866 new freight cars placed in service up to March 1, 11,319 were box cars, 9,717 were coal cars, and 1,748 were railroad-owned refrigerator cars. The new cars installed included 1,334 new refrigerator cars owned by

private refrigerator companies. Of the 102,912 new freight cars on order, 49,220 were box cars; 35,989, coal cars and 4,012 railroad owned refrigerator cars, as well as many other classes of freight car equipment, while private refrigerator companies had on order 9,147 refrigerator cars.

23.8 Per Cent Unserviceable Locomotives on March 1

Locomotives in need of repair on March 1, totaled 15,357 or 23.8 per cent of the number on line. This was a decrease of 224 compared with February 15, at which time there were 15,581 or 24.1 per cent. Of the total on March 1, 13,423 were in need of repairs requiring more than 24 hours. This was a decrease of 271 compared with the number in need of such repairs on February 15. Locomotives in need of light repairs totaled 1,934, which was an increase of 47 within the same period.

During the semi-monthly period from February 15 to March 1, the railroads repaired and turned out of their shops 17,207 locomotives. They had 49,199 serviceable locomotives on March 1, an increase of 265 over the number on February 15.

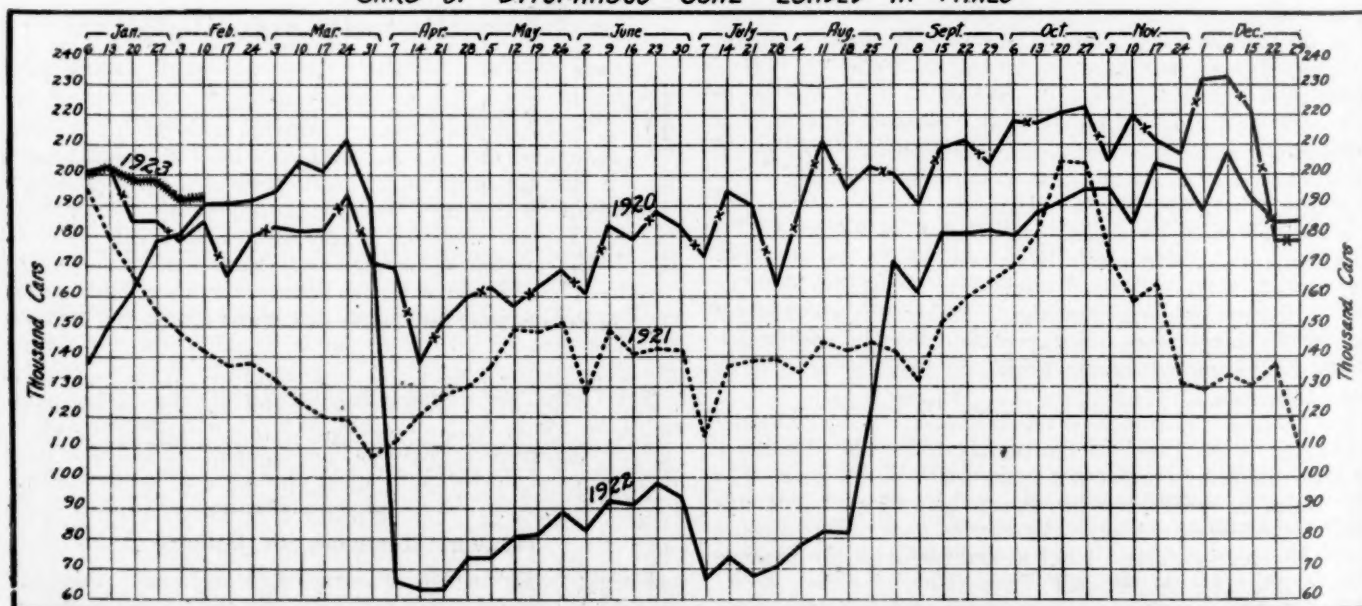
REVENUE FREIGHT LOADED

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY, MARCH 10, 1923

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L.C.L.	Miscellaneous	Total revenue freight loaded		
										1923	1922	1921
Eastern	1923	7,295	3,153	56,600	4,181	6,430	2,556	58,506	81,223	219,944	207,656	166,228
	1922	8,589	2,836	54,830	1,914	4,912	902	65,686	67,987	192,978	173,438	141,430
Allegheny	1923	2,829	2,459	52,774	7,047	3,509	3,064	46,630	74,666	35,919	37,549	23,173
	1922	2,648	2,424	57,552	4,128	2,395	1,384	50,383	52,524	146,564	125,309	112,090
Pocahontas	1923	221	81	22,963	557	1,622	221	6,154	4,100	118,586	103,746	96,410
	1922	225	74	26,417	232	1,100	15	5,931	3,555	136,332	119,928	103,606
Southern	1923	3,562	2,274	22,557	1,264	22,908	1,514	39,997	52,488	309,814	276,934	257,519
	1922	3,414	2,279	25,487	518	15,443	553	37,699	39,916	905,219	820,886	700,440
Northwestern	1923	13,339	9,754	7,525	1,670	23,321	905	28,620	33,452	204,779	204,779	820,886
	1922	12,707	9,304	10,622	1,249	15,461	617	27,204	26,582	917,896	793,115	711,367
Central Western	1923	10,461	11,587	19,453	400	9,181	3,054	34,772	47,424	830,223	728,925	659,642
	1922	12,109	10,383	23,224	326	5,063	985	32,976	34,862	817,778	773,275	692,007
Southwestern	1923	3,825	1,731	4,455	121	8,577	504	14,467	21,216	853,289	777,791	687,867
	1922	4,722	2,255	5,683	154	6,467	664	14,436	18,879			
Total West. Dists.	1923	27,625	23,072	31,433	2,191	41,079	4,463	77,859	102,092			
	1922	29,538	21,942	39,529	1,729	26,991	2,266	74,616	80,323			
Total all roads	1923	41,532	31,039	186,327	15,240	75,548	11,818	229,146	314,569			
	1922	44,414	29,555	203,815	8,521	50,841	5,120	234,315	244,305			
	1921	38,228	27,372	135,919	7,092	51,266	6,997	206,711	226,855			
Increase compared..	1922	..	1,484	..	6,719	24,707	6,698	..	70,264	84,333	..	..
Decrease compared..	1922	2,882	..	17,488	..	24,282	..	5,169	..	..	..	..
Increase compared..	1921	3,304	3,667	50,408	8,148	..	4,821	22,435	87,714	204,779	..	..
March 10	1923	41,532	31,039	186,327	15,240	75,548	11,818	229,146	314,569	905,219	820,886	700,440
March 3	1923	44,967	32,810	193,551	16,138	76,131	10,547	226,818	316,934	917,896	793,115	711,367
Feb. 24	1923	40,364	32,460	178,457	14,913	69,891	10,420	201,390	282,328	830,223	728,925	659,642
Feb. 17	1923	40,179	30,274	180,988	14,912	..	..	..	..	..	..	..
Feb. 10	1923	40,939	32,277	190,860	15,188	59,431	9,816	208,913	273,265	817,778	773,275	692,007
March 20	1923	..	..	..	..	64,310	10,110	216,323	283,282	853,289	777,791	687,867

Compiled by the Car Service Division of the American Railway Association.

CARS OF BITUMINOUS COAL LOADED AT MINES



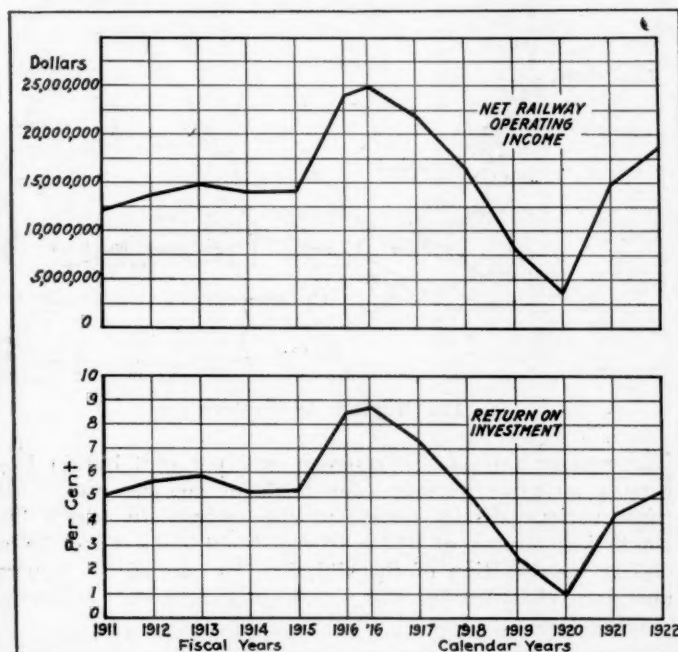
Norfolk & Western Has Record Gross Income

Corporate Net Income Increased 45 Per Cent Over 1921—
Favorable Result Due to Non-Union Coal

THERE WILL PROBABLY be few railway annual reports issued during the coming year that will exceed in interest that of the Norfolk & Western, made public on Monday of the present week. The Norfolk & Western's report is the first covering the year ended December 31, 1922, to be issued by any of the larger roads, or more particularly, by any of the roads in the group which the Interstate Commerce Commission distinguishes as having gross revenues ex-

Western in its main aspects was, of course, similar to that which governed on the Chesapeake & Ohio or the Louisville & Nashville and it happens, speaking generally, that the story of all three roads for 1922 was much the same. The Norfolk & Western serves five fields, the Thacker, Pocahontas, Tug River, Clinch Valley and Kenova. These fields are all non-union and as such they worked at record capacity while the strike was on in the union fields, up to July 1, when the railway shopmen's strike introduced a new condition.

The Norfolk & Western's coal movement began to reach unusual figures in March, when coal was moving in anticipation of the beginning of the coal strike on April 1. There was a continuance of the expansion of the coal tonnage during the following months. The best month for the year was June, in which month the revenue tons totaled 3,988,693; the revenue ton-miles totaled 1,175,082,337; the freight revenues were \$8,398,611; the operating ratio was 59.3, and



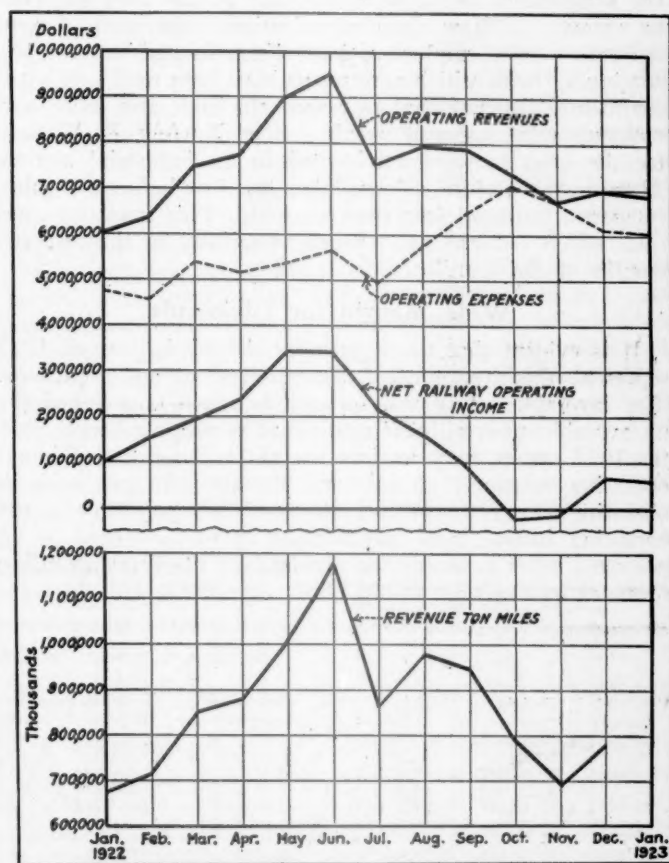
Net Operating Income and Return on Investment 1911 to 1922

ceeding \$25,000,000 annually. The Boston & Maine also belongs in this group, but as it happens, its report was made public on Tuesday, or one day later than that of the N. & W. The Norfolk & Western was similarly the first large road to get out its 1921 report a year ago.

In the *Railway Age's* editorial review of that report special significance was attached to the circumstance that the report was of interest not only because it was the first, but also because it could be regarded as typical of the annual reports which were to follow it. This is not the case with the 1922 report. The report this year cannot be regarded as typical for two essential reasons. One is that during 1922 the Norfolk & Western experienced a situation in connection with its principal commodity—bituminous coal—which was particularly its own, or which at most, was common to not more than two or three roads. The other reason is that the property was not, comparatively speaking, greatly affected by the readjustments in rates on agricultural products.

An Averaging of Contrasting Elements

The special circumstance which gives the Norfolk & Western's 1922 annual report its factor of interest, is our curiosity concerning the ultimate effect on the year's earnings of the contrasting elements contained in the movement of non-union coal during the bituminous mine workers' strike and in the check on this movement resulting from the railway shopmen's strike. The situation on the Norfolk &



Norfolk & Western Traffic and Earnings During 1922

the net operating income was \$3,403,803. The shop strike began on July 1 and judging by the manner in which the roads handling non-union coal were affected, the evidence is that the shop strike leaders must have given special attention to the railroad situation in the non-union coal territory. July was not the Norfolk & Western's poorest month in 1922, but the July figures offer, nevertheless, a most striking contrast with those for June. They showed revenue tons of 3,070,995; revenue ton-miles of 863,167,580; freight

revenues of \$6,478,149; an operating ratio of 65.4, and a net operating income of \$2,126,625. The sharp reductions from the June figures will be quickly apparent.

61.78 Per Cent in Second Quarter—95.66 in Fourth

In passing it may be mentioned that the N. & W.'s poorest months in 1922 were October and November. In both months there was a deficit after rents and in both months the operating ratio was 99 and a fraction. The annual report gives some interesting figures concerning this situation. Among them is a tabulation showing the operating revenues and expenses by quarters. The figures show, among other details, the following:

	Operating revenues	Net operating revenues	Op. ratio
January-March	\$19,855,008	\$5,150,905	74.06
April-June	26,171,647	10,003,877	61.78
July-September	23,337,436	6,234,556	73.29
October-December	20,988,797	910,746	95.66

In the last quarter of the year, of course, the movement of coal had been restored in the union fields, thereby removing the exaggerated demand for supplies from non-union fields. In the last quarter, also, net earnings were still reflecting the increased costs resulting from the shopmen's strike. The Norfolk & Western had considerable difficulty in building up a new shop force. The annual report says that in response to the shop strike call practically all the company's shopmen left the service. A new force was recruited and the situation at the close of the year is described as "close to normal." "New shop organizations, composed of your company's own employees, have been formed," the report continues, "with which agreements have been made, and it is confidently believed that increased efficiency and more harmonious relations will result. The Norfolk & Western for the most part, is not located in an industrial section. There was, therefore, a large labor turnover before a regular, competent working force was secured. This involved extra cost, which reduced net revenue materially in the last few months of the year."

Wide Margin for Dividends

It is evident that the figures for the whole year of 1922 represent the averaging of sharply contrasting conditions. The favorable conditions, fortunately much outweighed the unfavorable ones, with the result that as compared with 1921 the 1922 results show an increase of 11.94 per cent in total operating revenues, an increase of only 5.76 per cent in operating expenses, an increase of 28.39 per cent in net operating income, and an increase of no less than 44.92 per cent in net available for dividends. The total operating revenues for the year, \$90,352,887, were the best in the com-

proportions. It amounted to \$18,624,468, equal to 5.21 per cent on the company's property investment. This compared with \$14,870,020 in 1921, that figure being equivalent to 4.27 per cent on the property investment and it continued the substantial improvement in net operating income which 1921 made over 1920 or 1919. The best year in the company's history from the standpoint of this particular factor was the calendar year 1916, in which period the Norfolk & Western's net operating income totaled \$24,866,782, equal to 8.65 per cent on the property investment at that time. The net available for dividends in 1922 was \$14,554,989 as compared with \$10,043,181 in 1921. This left in 1922 a wide margin for dividends which totaled \$919,692 on the 4 per cent preferred stock and \$9,960,779 on the common.



The Norfolk & Western

The regular rate on the common is 7 per cent but in December an extra payment was made of one per cent. All these various details point out the manner in which the conflicting factors of 1922 averaged out. To assist in a clearer visualization of the situation, various of the figures are given elsewhere in this article in a table or plotted in graphic form.

Coal 75.28 Per Cent of Total Tonnage

In comparing 1922 with 1921, the outstanding factor is, of course, the marked expansion in coal tonnage due to the heavy movement of coal up to July 1, when the railway shopmen's strike intervened to nullify the Norfolk & Western's specially advantageous circumstance of serving non-union coal fields. It is interesting, although, of course, fruitless at this time, to speculate how much greater even

NORFOLK & WESTERN OPERATING RESULTS, 1912-1922

Year ended June 30	Freight revenue	Total operating revenue	Operating expenses	Net railway operating income	Operating ratio	Revenue tons	Per cent of coal tons to total	Revenue ton-miles	Average haul	Revenue train load	Revenue car load
1912...	\$34,022,572	\$39,735,237	\$25,669,430	\$13,668,435	64.60	29,335,583	67.60	8,030,301,398	274	692	30.12
1913...	37,588,024	43,739,921	28,565,813	14,855,907	65.31	32,701,743	64.71	8,856,070,381	271	764	30.57
1914...	38,038,622	44,470,619	29,935,842	14,020,688	67.32	34,000,572	68.30	9,155,506,727	269	802	31.60
1915...	36,550,550	42,987,044	27,831,815	14,359,735	64.74	32,767,701	71.05	8,918,549,288	272	841	32.56
1916...	49,559,140	57,304,586	32,181,346	24,045,710	56.16	44,373,456	68.22	11,795,891,557	266	967	33.77
Dec. 31											
1916...	51,114,186	59,449,982	33,508,732	24,866,782	56.36	46,421,391	66.03	12,110,422,936	261	980	33.94
1917...	56,381,036	65,910,242	41,161,503	21,928,006	62.45	48,196,792	60.18	12,456,970,303	258	1,021	34.87
1918...	68,752,260	82,004,034	61,579,297	16,450,087	75.09	46,801,920	58.77	12,255,303,617	262	1,041	37.37
1919...	62,681,028	76,925,599	64,021,285	8,176,538	83.22	37,944,615	63.95	10,026,871,317	264	1,106	37.48
1920...	73,918,301	88,489,356	84,943,837	3,612,843	95.99	40,685,743	63.99	11,063,033,480	272	1,107	39.90
1921...	67,221,461	80,718,802	64,346,857	14,870,020	79.72	29,684,935	73.33	8,482,095,487	286	1,013	38.35
1922...	77,672,461	90,352,887	68,052,804	18,624,468	75.32	37,357,078	75.28	10,422,300,577	280	1,049	38.99

pany's history, exceeding by about \$2,000,000 the previous peak of 1920. The revenue tons—37,357,078—exceeded those of 1921 by 25.85 per cent and the revenue ton-miles—10,422,300,577—were 22.87 per cent greater than in 1921. They were not, however, equal to the respective figures for 1920 or for various other preceding years.

Nor was the net operating income of record-breaking

than it was the coal movement might have been had it not been for the adverse effects of the shop crafts strike. However, the bituminous coal tonnage for the year totaled 28,120,614, an increase of 6,354,418 tons, or about 30 per cent over the 1921 total of 21,766,196. The 1922 bituminous tonnage totaled 75.28 per cent of the road's total revenue tonnage. The 1921 percentage was 73.33 and that figure was

the highest for a period of several years. Normally, the Norfolk & Western's bituminous tonnage averages nearer 65 per cent.

It was, of course, to be expected that the Norfolk & Western would be in an especially favorable position to handle efficiently the great expansion of non-union coal traffic which was offered to it. The property has favorable outlets both east and west—east to its extensive terminal development at Lambert Point, Norfolk; west and north to the lakes, and, in fact, in various directions through its connections—notably the Pennsylvania, which because of its large, although not majority stock ownership in Norfolk & Western, might be expected to give that property favorable consideration.

In 1922, of course, the road's coal traffic moved through unusual channels as demand arose for fuel in districts normally supplied from union coal districts. It is of interest, nevertheless, that the coal dumpings at Norfolk were in excess of those for 1921. They totaled 6,929,882 tons; in

INCOME STATEMENT		
	1922	1921
Freight revenue	\$77,672,461	\$67,221,436
Passenger revenue	9,191,620	10,077,720
Total railway operating revenues	90,352,887	80,718,802
Maintenance of way and structures	12,564,606	11,783,699
Maintenance of equipment	23,514,618	19,841,345
Transportation	29,106,712	29,849,426
Traffic	933,057	843,161
Total railway operating expenses	68,052,804	64,346,857
Ratio of expenses to total operating revenues.....	75.32	79.72
Net revenue from railway operations	22,300,084	16,371,945
Net railway operating income	18,590,689	14,479,836
Net income (net after fixed charges)	14,554,989	10,043,181

1921 they were 6,808,634. The increase in 1922 over 1921 was small but it could hardly have been expected to be in proportion to the increase of 30 per cent in total coal tonnage in view of the extent to which the supplies were needed at various places in the interior of the country.

Maintenance Conditions

The Norfolk & Western is a road of high physical standards. It is characterized by the manner in which it essays to keep its physical plant ahead of its traffic and its physical condition generally in the best condition to handle its business efficiently. For the year 1922 the Norfolk & Western had an average per cent of unserviceable freight cars of only 5.4, one of the lowest figures for any road in the country. On March 1, 1923, the percentage was 5.2. When the shopmen's strike began on July 1, the road had only 5.2 per cent of its locomotives held for repairs requiring over 24 hours and on the same date it had 172 serviceable locomotives stored in spite of the heavy business which it was handling at that time. This favorable condition was, of course, not maintained. The shop strike raised the percentage to 20.9 on September 1 and the number of serviceable locomotives stored was rapidly reduced. On the other hand, the percentage of unserviceable locomotives was gradually lowered as the strike situation was taken in hand. For instance, on October 15 the percentage was 12.3. The latest figure at present available is that for February 15, 1923—12.9 per cent.

In 1922 the Norfolk & Western charged to additions and betterments \$10,733,607, the larger part of which was equipment. The most important equipment received during the year was 5,500, 70-ton steel hopper cars. These cars were sufficient to effect an increase of 7.76 per cent in the total capacity of the freight cars in the road's service.

Maintenance-of-Way

During 1922, the road used in maintenance-of-way 56,276 tons of rail as compared with 39,940 in 1921. It put in

track 1,492,036 ties as compared with 1,787,040 in 1921 and used 470,740 cubic yards of ballast as compared with 379,464 in 1921. The 1921 figures incidentally, except for ballast, were much in excess of those for years immediately preceding. Some idea of the road's maintenance standards is contained in the information that during 1922 it laid 70 miles of track with 130-lb. rail, making the total miles of track laid with such weight of rail 115. It laid also 221 miles of track with 100-lb. rail, making a total now laid with that weight, 1,516. The company recently completed a new tie treating plant at East Radford, Va. This plant during 1922 treated 745,931 ties and at present about two-thirds the company's total tie requirement is met with treated ties.

Transportation Ratio of Only 32.27

The Norfolk & Western's operating expenses in 1922 totaled \$68,052,803 or 5.76 per cent less than in 1921. The operating ratio for the year was 75.27; in 1921, it was 79.25. Maintenance-of-way expenses totaling \$12,564,606, were 6.63 per cent greater than in 1921. In 1921 the ratio of maintenance expenses to total operating revenues was 14.59 and in 1922 it was 13.78. These percentages are both rather high and give an indication of the attention the Norfolk & Western is paying to this particular feature. The maintenance of equipment expenses totaling \$23,514,618 in 1922 were 18.51 per cent greater than in 1921 and reflect not only increased business but also the sharp effect on costs of the shopmen's strike. It is interesting to notice that even with the increased business handled the transportation expenses totaling \$29,106,712 were actually 2.49 per cent less than in 1921. This was due to various factors of which the most important was a reduction of 22.8 per cent in the item of "fuel for train locomotives." The ratio of transportation expenses to total operating revenues—the C. T.—was in 1922 only 32.27, comparing with 37.17 in 1921, a figure which indicates an unusually favorable situation concerning the control over operating expenses.

The facts seem to be that the Norfolk & Western came out on top of its unusual 1922 situation. It profited in a most satisfactory manner from its movement of non-union coal. As a result, it was able to compensate rather handsomely for the adverse state of affairs resulting from the shopmen's strike and as a final result to show better than average results for the year as a whole. It is difficult to determine whether the increased costs due to the shop strike are as yet over with. The equipment condition as shown in the percentages, however, is sufficiently favorable to indicate that the situation must be now about in hand. With more normal business—the word "normal" is used advisedly—in 1923 the Norfolk & Western should be able to show another favorable report.

Ripolin Railway Enamel System

A NEW ENAMEL PAINT, notable for speed of application, economy and durability, has recently been introduced in this country by the Glidden Company, Cleveland, Ohio. This material, which is known as Ripolin, originated in Holland and has been used abroad quite extensively for many years. The Ripolin railway enamel system is applicable for both interior and exterior work and can be applied on wood, metal, concrete or other surfaces.

As evidence of the unusual durability of Ripolin enamel paint, instances are on record where it has successfully withstood the action of the elements for as high as 17 years without disintegration. Cases where it has withstood 10 or 12 years' exposure are not at all uncommon. In this country it is the usual practice to refinish passenger equipment in from 18 months to two years. In France, under the Ripolin railway enamel system, the railroads find it necessary to refinish

cars only once in four years, at which time, instead of completely removing the old finish, it is merely cleaned off, abrasions spotted with putty and a single additional coat of Ripolin railway finishing enamel applied.

It is claimed that fewer coats are required under the Ripolin railway enamel system to produce a satisfactory finish than with any other method ever developed. This is important because it insures that equipment taken into the shop will be idle a minimum length of time and will be quickly returned to revenue earning service. As an example, one trunk line railroad has reduced its finishing schedule from 11 coats in 23 days to five coats in seven days and very often the equipment is finished with five coats in six days. For locomotive work four coats in five days under the Ripolin system will produce a finish that compares favorably in appearance and durability with that formerly produced with seven coats in 12 days under the old system.

The limited number of coats required results in a corresponding reduction in labor costs as well as the quantity of material required. In addition to these economies the length of time before repainting becomes necessary is considerably increased which further reduces the expense of maintaining the equipment. Ripolin is well liked by painters because it goes on easily as compared with other enamels and has a great covering capacity. In an experiment to determine how far it would be possible to spread Ripolin railway finishing enamel, it was found that one gallon would cover a total of 900 sq. ft. In ordinary painting practice it is not unusual for Ripolin to cover 750 sq. ft. per gallon.

Ripolin is made in either high gloss or semi-gloss finish. Either types of enamel makes a flexible non-porous film. A variety of colors is available suitable for passenger car, building or marine work.

Dr. Couzens Prescribes for the Railroads

WASHINGTON, D. C.

SENATOR COUZENS of Michigan has issued a statement telling what he thinks is the matter with the railroads, in which he attempts to discuss their efficiency on the basis of statistics of the abnormal period of two or three years ago and says that the locomotives of all of the railroads are less efficient than those of the best railroads without attempting to state how this condition can be improved or mentioning the various factors, such as the location of the railroads and their grades, conditions of traffic, etc., as affecting the showing made by one railroad as compared with another. Senator Couzens says in part:

"Now that Congress has adjourned and there appears to be no probability of an extra session, which means approximately nine months without any legislation, which is no doubt fortunate, it appears that all kinds of organizations are being formed by various interests to make a study of the railroad problem and out of which, I assume, to make suggestions to improve over present conditions. It looks to me as though the railroad doctors were preparing to give the public an anesthetic in preparation for an operation to take place, no doubt, at the next session of Congress. The diagnosis of our trouble will be made, I think, while we are partially, at least, under the influence of this anesthetic, which will consist mostly of statistics, curve lines, and all kinds of tables.

"I am writing this memorandum to suggest to those who administer the anesthesia and to the railroad surgeons that during the course of their work they will not overlook a few points that need looking into. It is quite a common complaint that, while the country seems to be exceedingly prosperous and still better times are coming, there is a restlessness

and uncertainty on every hand. Many will adopt the policy of the ostrich, bury their heads and fail to see this restlessness; others will try to camouflage the situation by investigating committees that should be investigated themselves; and still others will form boards of inquiry that start out with the best intentions in the world, but eventually wind up with so many compromises that they might just as well have taken a pail of white paint and covered the thing up at first.

"There is an immense amount of propaganda even now being circulated in defense of the railroads as now operated and there are also demagogues going around the country overstating our railroad difficulties, and with all of this it is going to be hard for the patient (the public) to properly determine the kind of medicine or surgical operation they should have to effect the remedy.

"The inadequacy of railroad facilities is admitted, and this inadequacy is chiefly responsible for high operating costs and consequently excessive freight rates. No less authority than President Rea of the Pennsylvania Railroad, immediately prior to the break-down of the railroads in 1917, declared that the railroad facilities of the country had become so impaired as to become a menace, not only to the cause of the Allies, but to the industrial and business ability of the United States, since which time there has been a continual reduction in the annual construction of new lines. This may seem 'old stuff,' but it is mentioned because so much has been said about the pre-war condition of the railroads and the condition of the railroads when returned to private management. A study of the records of the Interstate Commerce Commission showed vast opportunities for more efficient management. For example, for 18 years there has been no improvement in locomotive performance. On the contrary, the figures indicate positive losses in tractive efficiency during this period. While the average tractive effort of locomotives in freight service has increased about 60 per cent, freight train miles per locomotive have decreased 16 per cent to 1919, with some recovery in 1920.

"Notwithstanding larger and more powerful locomotives and increased size of trains, the net ton miles per 1,000 pounds of tractive effort in 1920 was exactly the same as it was in 1903, 260,000, so that in all of these years there really has been no improvement. An examination shows that the miles per freight locomotive day average of the ten best railroads, shows 77.2 miles, while the average for 39 large roads is 63.4 miles. If all of these roads averaged what the ten best roads averaged, there would be a saving in locomotives required to handle the business of over 6,000, which at \$50,000 each would mean a saving of \$300,000,000 in capital investment. This is only for freight and a study of the passenger locomotives indicates a possible saving of 2,000 additional locomotives or \$100,000,000. The average coal consumption of freight locomotives on 40 large steam railroads shows 201.72 pounds per 1,000 gross ton miles, while the average for the ten best roads shows 160.07 pounds. If all these forty roads maintained the average of the best ten, there would be a saving of 11,452,083 tons of coal at an estimated cost of \$4 which would mean an annual saving of \$45,000,000. The same rule applied to passenger locomotives would create a saving of \$20,000,000.

"I could go on at considerable length to point out many more possible savings, but I think this is sufficient to draw the attention of these doctors to some of the troubles that need diagnosing. Mr. Henry Ford has drawn the attention of the railroads a number of times to the great necessity of reducing weight so as to reduce the enormous amount of dead tonnage hauled. He has pointed the way on a number of occasions of how to reduce costs without reducing wages, all of which should receive the serious and earnest consideration of those who want to solve the problem and whose diagnosis is expected to be relied upon, when the operation is performed at the next session of Congress."

Accident Investigations— October, November, December*

THE FOURTEENTH quarterly issue of the summary of train accident investigations, prepared by the Bureau of Safety of the Interstate Commerce Commission, which is for the months of October, November and December, was issued on March 1. The report covers 23 collisions and 10 derailments.

Below is a list of these accidents, the serial number in the first column being that shown in the records of the commission. The letter *c* indicates collision and *d* derailment.

Seven of these reports have already been noticed in the *Railway Age* as noted at the bottom of the list, and 16 are abstracted below; leaving 12, of relatively less importance, which must be omitted because of limitations of space.

ACCIDENT INVESTIGATIONS COMPLETED IN FOURTH QUARTER OF 1922

884	c	Boston & M.	Rollinsford, N. H.	October	8
885	c	Penn.	South Lebanon, Ohio	"	9
886	c	Atchison T. & S. F.	Burbank, Okla.	"	10
887	c	Lake Erie & W.	East, Lynn, Ill.	"	15
888	c	Del. & Hudson	Sidney, N. Y.	"	18
889	c	Lehigh Valley	Glen Onoko, Pa.	"	19
890	d	Wabash	Williamsport, Ind.	"	19
891 ¹	d	El Paso & S. W.	Cabeza, N. Mex.	"	25
892 ²	c	Southern Pac.	Adeline, La.	"	31
893	c	Penn.	Earnest, Pa.	November	1
894	c	Florida E. C.	Everglade, Fla.	"	2
895	c	Southern Pac.	Bremond, Tex.	"	4
907 ³	c	Union Pac.	Hillsdale, Wyo.	"	4
896 ⁴	c	Union Pac.	Buford, Wyo.	"	5
897 ⁵	c	Union Pac.	Borie, Wyo.	"	5
898	c	Penn.	Cincinnati, Ohio	"	7
899	d	Great Northern	Reiter, Wash.	"	8
900 ⁴	c	Lake Erie & W.	Denver, Ind.	"	9
901	c	Southern	Sadleville, Ky.	"	14
902	c	Phila. & Reading	Mintzers, Pa.	"	15
903	c	Phila. & Reading	Philadelphia, Pa.	"	23
904	d	Texas & Pacific	Mack's, Tex.	"	24
905	d	Great Northern	Andover, Minn.	"	26
906	c	N. Y. Ontario & W.	Cooks Falls, N. Y.	"	29
908	d	Atchison T. & S. F.	Landco, Calif.	December	2
909	c	Atlantic C. L.	Manahan, S. C.	"	9
910	d	Phila. & Reading	Port Clinton, Pa.	"	12
911 ⁵	c	Southern Pac.	Humble, Tex.	"	13
912	c	M. St. Paul & S. S. M.	Thorpe, Wis.	"	14
913	d	Chicago & N. W.	West Bend, Wis.	"	14
914	c	Ill. Central	Amboy, Ill.	"	23
915	d	Denver & S. L.	Antelope, Colo.	"	24
916	d	N. Y. Ontario & W.	Arrowhead, N. Y.	"	25

¹ Reported in *Railway Age*—December 2.

² Reported in *Railway Age*—January 13.

³ Reported in *Railway Age*—February 10.

⁴ Reported in *Railway Age*—January 13.

⁵ Reported in *Railway Age*—December 23.

Abstracts of Reports

Boston & Maine, Rollinsford, N. H., October 8.—Westbound freight extra 2624 collided with eastbound passenger 1757 as the passenger was crossing the westbound track to enter the Somersworth branch; both locomotives and two cars badly damaged, engineer of passenger train killed and four passengers and four employees injured. The freight train was moving at about 25 miles an hour or faster. It had passed an automatic block signal set against it, and the engineer is also held to have been oblivious to a red ball signal—three red lights on a high post—situated at the switch where the passenger train was crossing, and plainly visible from the locomotive cab of the approaching freight. Also, the freight was required by the rule to be running under control within yard limits. A manually operated semaphore 1,100 ft. to the rear of the point of collision, not interlocked, was standing at clear, the station being unattended at the time (Sunday evening, 8:17 p. m.); the ball signal also was not connected with the switches. The fireman of the freight is held also responsible for failing to see the indications of the signals.

Pennsylvania, South Lebanon, Ohio, October 9.—Westbound freight train No. 485, first section, ran into the rear of a preceding extra freight train which had slackened speed

to enter a sidetrack, and the locomotive was overturned. Several cars were wrecked and the fireman was killed. This collision occurred about 9:47 p. m. on a line operated by the manual block system. Train 485 was running under a permissive signal and the engineer is held at fault for running with speed not under control; the flagman of the extra is, however, held to have been "extremely negligent;" and the conductor responsible equally with him. The report says also that the train dispatcher ought to have complied with the rule requiring all messages respecting the movement of trains to be in writing. He had given oral instructions, through a station operator, that these trains should not leave Morrow unless they had time to go to Foster's. The inspector believes that if the dispatcher had complied with this rule, certain conditions leading to this collision would have been avoided.

Atchison, Topeka & Santa Fe, Burbank, Okla., October 10.—Eastbound work train extra 579, moving at about 10 miles an hour, collided with westbound freight extra 4009, moving at about 20 miles an hour. The fireman of the work train was killed and three other employees and one trespasser were injured. No block system is in use on this line and the cause of the collision was the failure of the men on the work train to identify a westbound train; westbound extra 4002 had passed while the worktrain was at Burbank, and the number on its locomotive was taken for 4009 by the work train conductor, who, at the moment the locomotive passed, was trying to prevent an automobile in the street from being struck by the train; he saw the number through the windshield of the automobile. It appears, however, that he probably assumed that this train was 4009 because, from the wording of a certain train order, he was expecting that number; but that train (4009) had been passed by No. 4002. The work train engineer appears to have made no effort to see the number of the passing locomotive, and a brakeman is also at fault in the same way. Failure to show train orders to brakemen was an element in the failure to identify the freight train, and the work train flagman is censured for not having asked for his copy of the train orders, as he should have done under the rule. On the work train, all members of the crew except the conductor and the engineer were inexperienced.

Lehigh Valley, Glen Onoko, Pa., October 19.—Westbound freight extra 2147, stopped, about midnight, on an ascending grade because of failure of the automatic stoker, was run into at the rear by westbound passenger No. 5, moving at about 10 miles an hour; a brakeman in the caboose was killed and one other employee was injured. The passenger train had passed two automatic block signals, a caution signal and a stop signal, and the engineer is held responsible for not keeping a good look out. The freight train is responsible also for not having placed torpedoes, as might have been done; torpedoes, undoubtedly, would have aroused the engineer in time to have prevented the collision. The flagman of the freight had gone back to the home signal, 571 ft. in the rear of the caboose, and thought that that was far enough. The engineer said that he was somewhat confused by the bright light from a headlight of a train of the Central of New Jersey, the line of which is adjacent to that of the Lehigh Valley, and also had his attention diverted to the water glass, so that he temporarily forgot that he was running under a caution signal. The engineer at fault had been a runner for 26 years, the conductor of the freight had an experience of 27 years and the flagman, who had been in service 18 years, had qualified for conductor in 1917. All had good records.

El Paso & Southwestern, Cabeza, N. M., October 25.—Westbound freight train, moving at 67 miles an hour, was derailed at a sharp curve, and nearly the whole train was piled up in a bad wreck; engineer and one brakeman killed and two other employees injured. This derailment was re-

* The last seven preceding quarterly reports of investigations were noticed in the *Railway Age*, as below:

No. 7 1921, July 2, 1921, page 35; No. 8 1921, Sept. 3, 1921, page 459; No. 9 1921, Dec. 10, 1921, page 1145; No. 10 1921, June 10, 1922, page 1343; No. 11 1922, June 17, 1922, page 1483; No. 12 1922, Sept. 2, 1922, page 426; No. 13 1922, Dec. 30, 1922, page 1239.

ported in the *Railway Age* of December 2, page 1062. The inspector found that no test of the air brakes was made at Solana, where a second locomotive was attached to the train because of the failure of the regular engine. The train ran away on the steep descending grade because the air brake system was not operating throughout the train. It is believed that the pressure in the brake pipe had leaked off while the train was standing at Solana for about an hour and thirty minutes; and that the brake pipe between the two locomotives was not properly coupled or else the angle cocks were not opened when the locomotive was coupled to the train. Some time before reaching Solana, the train had to be separated into two parts to get it up a hill; and here, as well as at Solana, the men in charge neglected to test the brakes, as required by the rule. There was nothing in the circumstances affording any shadow of excuse for this neglect. The trainmen said that they had not been in the habit of making the prescribed tests; and for this, says the report, the operating officials must be charged with neglect.

Pennsylvania, Earnest, Pa., November 1.—Westbound extra freight 3423, moving from a middle siding to the main track at low speed was run into at the side by westbound extra freight 2253, moving at about 12 miles an hour; one locomotive overturned, engineman and brakeman killed and one other employee injured. The collision occurred about midnight, on a line operated by the manual block system. The conductor of the freight leaving the siding had moved his train out without first getting permission by telephone from the dispatcher, as is required by rule; but the flagman of this train is held to be "open to severe censure" for making no effort to stop train 2253 of which train he had an unobstructed view from the rear of the caboose on which he was riding. He claims that he did not know that his train was going to enter upon the main track, but the inspector has no doubt that if the flagman had been alert and attending to his duty, he would have flagged train 2253 in time to have prevented the collision. He had noticed that 2253 had a clear signal at the entrance of the block section.

Florida East Coast, Everglade, Fla., November 2.—Collision between northbound freight No. 22 and a work train moving south; three employees killed, 11 injured. The section of line on which the work train was engaged was nearly all tangent but there is a two-degree curve about midway between the stations and on this the collision occurred. The conductor of the work train had left a flagman at Cross Key to hold the freight train, as he says, until 1:25 p. m., but the flagman maintains that he was instructed to hold the train only until 1:15 p. m.; and this misunderstanding was the cause of the collision. The conductor is held responsible, for it was his duty to know that his instructions were thoroughly understood by the flagman. A general rule requires that orders respecting the movement of trains shall be in writing but the employees involved claimed that the rule did not apply to a case like this. The officers of the road claim that it did apply, but they had provided no form for giving such an order. The report calls attention to the fact that where the rule requiring flagmen's instructions to be put in writing is consistently enforced, a prescribed form is provided. This accident, says the inspector, emphasizes the necessity for the block system.

Houston & Texas Central, Bremond, Texas, November 4, 4:06 a. m.—Westbound passenger train No. 37, moving at 15 miles an hour or faster, ran over a misplaced switch and into the rear of westbound mixed train No. 65, crushing the rear car, a sleeping car, on No. 65. One passenger was killed and 11 were injured. Train 65 had just left the main line and was standing at the station on the Waco branch. The flagman of this train claims that he had set the switch straight for the main line immediately after the rear car of his train passed over it; but the inspector believes that he failed to do so. There was some testimony supporting his

statement, which the inspector classed as incredible, not to say fiction. The switch at this point, like many others on this section of the road, has no light, and when it is set for the main track, the target, 18 in. in diameter, stands with its edge toward approaching trains. The use of lights on switches on this division was discontinued about the year 1900 when electric headlights were introduced; however, at the time of this collision the target, painted red, could not be seen from approaching trains farther away than 450 ft. There were some disorderly young men on the train and a claim was made that probably they had misplaced the switch maliciously, but the inspector finds no evidence to support this theory. The engineman of train 37 is held at fault for approaching the switch at about 35 miles an hour in violation of a special rule requiring caution at this point because train 65 regularly backs from the branch to the main track to attach sleeping cars left by main line train No. 17.

Southern Railway, Sadieville, Ky., November 14.—Work train 6422, moving south, and northbound freight No. 76, second section, both trains moving at less than eight miles an hour, met on a high bridge. The work train was driven back some distance and when the engines came to rest, they were about 200 ft. apart. The third and the sixth cars in the freight train were badly damaged. The engineman of the work train was killed and two other employees were injured. The freight train had been flagged by a man from the work train and had stopped at an automatic block signal; but its engineman is held responsible for the collision because he then proceeded without sending a flagman ahead. There is a rule under which, in a case like this, if the flagman is at an automatic signal, with proper instructions on Form 895, a train may proceed under control to the next block signal; but this flagman was not at the block signal and his instructions were on plain paper, not on Form 895. The instructions, written by the conductor of the work train, were addressed to the flagman and simply said, "Drive work ex 6422 and work ex 6159 in at Hinton" (several miles north). The report concludes with a quotation from a report which was made on a somewhat similar collision on the St. Louis-San Francisco, near Adamsville, Ala., on August 9, 1919.

Philadelphia & Reading, Mintzers, Pa., November 15.—A northbound extra freight, 1543, moving at low speed, about 3:55 p. m., on an up grade of one per cent, ran into the rear of a preceding extra freight, 1629, which had been stopped because of breaking in two. The locomotive was overturned. A brakeman was killed and one other trainman was injured. Train 1543 had been helping train 1629, and had just cut loose from it, when the break-in-two occurred. The engineman of 1543 excused himself for coupling into the preceding train without detaching his engine from his own train because the rear of his train, with pushing locomotives, was in Tamaqua tunnel, and it was desirable to move them out of the tunnel as soon as possible. The cause of the break-in-two appears not to have been discovered; train 1629 had been subjected at Tamaqua only to a "main track inspection," in which only three cars had been examined when the train started.

Atlantic Coast Line, Hanahan, S. C., December 9.—Northbound passenger train No. 52, standing at the station, having been delayed there a few minutes because of a hot journal, was run into at the rear by following passenger train No. 80, second section, consisting of eight empty passenger cars, six express cars and one coach, while moving at about 35 or 40 miles an hour. One passenger was killed and 36 other persons were injured. The collision occurred about 7:07 a. m. when there was considerable fog; and the moving train had run past automatic block signal No. 3842, set against it. The engineman said that signal 3852, about one mile back of the other signal, was moving up and down, and he thought it might be out of order; he is censured, however, for disregard of the rule requiring that a signal imperfectly displayed

must be regarded as a stop signal. The signal was working properly immediately before the collision and immediately after, and the inspector can find nothing wrong about it. The principal conclusion of the report is that automatic train control is needed in a case like this. This engineman was a runner of long experience.

Philadelphia & Reading, Port Clinton, Pa., December 12.—A southbound freight train consisting of locomotive No. 1712 and 72 cars was derailed opposite the station by the breaking of the trailer truck radius bar of the locomotive, while the train was moving at about 15 miles an hour; and some of the 18 cars thrown off the track, falling against passenger train No. 9, moving slowly in the opposite direction on the adjacent track, overturned two passenger cars. Two passengers were killed and 20 passengers and four employees (not on duty) were injured. The radius bar was found to have been broken on both sides; and the break on the right side was the result of a flaw which had existed for some time. Grease and dirt adhering to the bar obscured this defect to such an extent that it would have been difficult to detect it.

Southern Pacific, Humble, Tex., December 13.—Eastbound passenger train No. 28, moving at about 20 miles an hour, collided with a yard locomotive standing or slowly moving on a side track and fouling the main track; the train was quickly stopped but the check valve on the boiler of the yard locomotive was broken off and escaping steam filled one of the coaches; 19 passengers, one news agent and two employees were killed and 10 passengers and one employee injured. This collision was reported in the *Railway Age* of December 16 and 23. The government inspector finds that Watchman Smith, in charge of the yard locomotive, told conflicting stories, his claim being that a leaky throttle valve caused the movement of the locomotive; but the conclusion is that the watchman, for his own convenience in supplying fuel oil to the locomotive, had moved it from side track No. 1 to side track No. 3 and in doing so ran a short distance beyond the fouling point with the main line. This watchman had been employed by the road in 1920 and had worked at Humble since August, 1921.

Minneapolis, St. Paul & Sault Ste. Marie, Thorpe, Wis., December 14.—Westbound passenger train No. 3, moving at about 20 miles an hour, collided with eastbound freight No. 22, moving at the same or a higher speed; and three locomotives, four cars of the westbound train and 13 of the eastbound were badly damaged. The engineman of the leading engine of the freight and the fireman of the second engine were killed, and ten passengers, five employees and one mail clerk were injured. This collision was caused by the failure of the train dispatcher to issue train order No. 30 to train No. 22. Order No. 22, delivered to both trains, said that train No. 3 would wait at Thorpe until 5:27 a. m.; the later order allowed it to pass Thorpe earlier, but was not sent to the freight train. It had been issued at Irvine, 32 miles west of Thorpe, to "all concerned," but train 22 had already left Irvine, and this fact was overlooked by the dispatcher. This collision occurred on a long straight line. Both locomotives had electric headlights and the report gives the statements of men on the freight and of the engineman concerning their seeing the opposing headlight; but there is little or nothing to indicate how good a lookout these men were keeping. The grade of the road is undulating.

Illinois Central, Amboy, Ill., December 23.—In a collision between a freight engine, moving northward, tender first, and a work train, moving south, at 6:45 a. m., when it was dark and misty, both trains moving slowly, within yard limits, the fireman of the work train was killed and four other employees were injured. The inspector finds that the engineman of the work train failed to keep a proper lookout; but this man was injured and in the hospital so that he could not be examined.

Denver & Salt Lake, Antelope, Colo., December 24.—An

eastbound freight train consisting of a locomotive and 23 cars of coal became uncontrollable on a very steep grade—three or four per cent—and was derailed at a 16 deg. curve while running at 40 or 50 miles an hour. The engine and 13 cars were wrecked and the engineman and one brakeman were killed. One other employee was injured. The inspector believes that the engineman failed to operate the brakes properly, as the train had been successfully controlled on a heavy grade before reaching Antelope; but after departing from Antelope, the brakes, after being once applied, were released before the speed had been sufficiently slackened. The officers of the road are censured severely for permitting a train to be run on this steep grade (11 miles long) by a crew composed entirely of men lacking in experience. The engineman had made but one trip, as engineman, over this portion of the road and that was over a year ago; the fireman had had only six weeks' experience in railroad service; the conductor was making his second trip as conductor in 12 months; the front brakeman was making his first trip over this territory and the rear brakeman had made only one trip as brakeman since November, 1921. Also, these men had been on duty about 21 hours.

Simple Device Locates Electric Circuit Troubles

A SIMPLE, but ingenious, device for testing signal circuits has been devised by Jesse Debrick, assistant foreman of signals at Baltimore on the Pennsylvania. The device itself consists only of a pair of iron rods connected



J. E. Debrick Testing Signal Circuits on the Pennsylvania

to a telephone receiver. The rods are about the length of an ordinary walking stick, are pointed at one end and are bent into the form of a handle at the other. One of the two

terminals of the telephone receiver is connected to each of the iron rods.

The process of locating trouble with the device consists simply of thrusting the pointed ends of the rods into the ground and listening with the telephone receiver. When a short circuit is reported on a given circuit, a pulsating direct current, or an alternating current, is impressed on the grounded wire. The other terminal of the power supply is connected to ground, thus making a complete circuit. The operator walks alongside, or over the trunking which carries the grounded wire and pushes the iron rods into the ground at points approximately a yard apart alongside of the trunking. One of the rods should, of course, be closer than the other to the point at which the current used for testing is impressed on the wire as the function of the device is to detect the presence of the return circuit in the earth. If the rods are on the feed side of the ground, a noise is heard in the receiver. The iron rods are then moved one at a time along the wire until the sound ceases. This indicates that the trouble has been passed as the rods have been moved out of the return ground circuit. An open circuit may be located in a similar manner as there is a condenser action between the earth and the wire which sets up a flow of current through the receiver sufficient to make an audible sound. The device was made for testing signal circuits, but, of course, has a wider application and can be used also for locating trouble on telephone or power circuits.

Recapture of Excess Earnings Upheld

WASHINGTON, D. C.

THE SO-CALLED "recapture" provisions of the Transportation Act of 1920 were held constitutional in a decision of three federal judges sitting as a special court at New Orleans on March 17, denying and dismissing the petition by the Dayton-Goose Creek Railway for a preliminary injunction to stay and suspend an order of the Interstate Commerce Commission calling for the payment to it of one-half of the company's excess earnings above 6 per cent for 1920 and 1921 and the payment of the other half into a reserve fund.

Copies of the decision have been received here by counsel for the Interstate Commerce Commission and the United States who appeared in the case and some surprise was caused when it was found that the court had decided the case by treating the recapture provisions as an exercise of the government's taxing power. The Interstate Commerce Commission in its brief had not even raised that point, although it had been discussed in response to questions by the judges at the hearing. The decision was also based on the broad ground that the government had the power to aid roads needing help by allowing the roads as a whole to collect rates on a higher basis than some of them would require, and by creating a special fund from such excess which could be used to help others.

While the recapture of excess earnings is not denominated a tax, the court said it is, in effect, an excise tax levied on all carriers subject to the transportation act.

Although newspaper reports of the decision have referred to it as requiring the railroads to pay to the government approximately \$75,000,000, the decision actually applies only to the application for an injunction by this company. No sum of money was mentioned in the decision and no authoritative estimate of the amount which the government may attempt to collect has been made, for the reason that the valuations on which the 6 per cent are to be determined have not been completed. In any event, there is no authoritative estimate which even approaches such a figure for that

part of 1920 during which the roads were not under guaranty and for the full year 1921. The company in its petition had said the commission was endeavoring to collect \$10,833 for 1920 and \$16,833 for 1921, based on the company's own report as to its value.

The court says that the commission had demanded payment from this road and had set the date for payment, although the commission in its brief had taken the position that it had not "demanded" payment, but had merely admonished the company that the law provided for such payment. The court said in part:

"The Transportation Act of 1920 was passed by Congress to accomplish a number of purposes. The Congress determined that its power to regulate interstate commerce must now be exercised to a wider extent than before in order that an adequate system of interstate transportation should be preserved for the commerce of the country. It would not be seriously questioned that, in returning the railroads to their owners, the United States could have made an appropriation creating a revolving fund and prescribed for its use in aiding railroads, as is now provided by the Transportation Act of 1920. It would be a reasonable exercise of its right to thus partly compensate for the use of their property during the period of government operation."

The court also called attention to the fact that all railroads are post roads and said that the powers of the government under the post road authority of the Constitution would authorize aid to be extended in the manner prescribed in the Transportation Act to keep up and make efficient such railroads as needed the same. The only question left, it said, therefore, is as to the government's right to raise this fund so to be used by requiring the railroads to pay to it one-half of the excess earned by them over a certain percentage.

"The power of Congress to regulate interstate and foreign commerce includes power to adopt measures to aid and encourage such commerce. To promote those objects it may exercise the power of taxation. While the exaction in question is not denominated a tax, it is, in effect, an excise tax levied on all carriers subject to the Transportation Act, payable from surplus earnings. In other words, the carriers are exempt from this tax who do not earn a certain percentage on their invested capital and all are exempt up to this percentage of net earnings. We see no reason why the United States cannot measure this tax by the excess of profit realized over a specified percentage."

That this levy applies to earnings from intrastate as well as from interstate transportation is not a sound objection, the court said, for the reason that regarded as a tax levied by the government it can be measured by the entire profit of a railroad as well as by a percentage on that part of the surplus net income derived from interstate business.

"Indeed," the decision said, "this part of the net income of the road is not collected by it absolutely as its property, but is earned and collected under the terms of the Transportation Act to be held in trust for, and to be paid to, the United States. It is not contended that the part of its net income from its railway operations which, under the provision in question, the complainant is permitted to retain, is less than a fair and remunerative return on its investment in road and equipment. So far as the complainant is concerned, the practical result is the same as it would have been if the rates and charges had been so fixed as to enable it to receive for such service a compensation no greater than the amount it is permitted to retain after deducting the sum required by the Transportation Act."

Regarding the contention of the railroad that its apparent net income for the period in question might be reduced by later payments on account of litigation, such as for overcharges, the court says that if the carrier has no right to the fund it cannot raise the question of constitutionality of this part of the act.

E. T. Whiter Addresses Western Railway Club

Questions Ability of Government to Finance Roads Under Conditions Unattractive to Capital

THE PRESENT campaign of "bunk" by which the public is being misled with respect to the railroad situation is sponsored by two types of men, political demagogues and labor demagogues, the common motive of both of whom is to get the votes necessary to keep them in office, is the opinion of E. T. Whiter, acting vice-president, Northwestern region, Pennsylvania System. Speaking before the Western Railway Club at Chicago on March 19, Mr. Whiter also pointed out that it is not the owners of the railways, but the public and the employees, who stand to suffer if the demagogues succeed in forcing the public to adopt government ownership, because, the worth of the security owners' holdings have been confirmed by the Interstate Commerce Commission valuation.

After commenting briefly on the two most outstanding misrepresentations of the anti-railway propagandists, that the valuation of \$18,900,000,000 tentatively placed on the railroads by the Interstate Commerce Commission is heavily watered, and that rates are too high, Mr. Whiter drew attention to the meaning of government ownership.

"Just remember what happened during the period of Federal control, during the war," he said. "Thousands of men were put on the payrolls who were not needed. Four or five men were used to do a one-man job; 'soft berths' were created for political favorites; payrolls were increased about \$2,000,000,000. James P. Davis, the present director general of railroads, in a speech in Boston a few days ago, said he believed the government had lost \$1,800,000,000 under government control of the railroads. What he meant to say, no doubt, was that this experiment cost the American people that huge sum of money. Government ownership is simply a drug. If people want adequate railroad service, the plain fact is that they must pay reasonable rates for it. They may soothe themselves into thinking they get cheaper transportation under government ownership, but actually they will pay a great deal more for it in taxes and poorer service.

"Furthermore, it is well to bear in mind, in connection with the agitation that is being continued for government ownership, that the owners of the railroads,—their security holders,—have no longer anything to fear, as far as financial loss is concerned, from government ownership; the Commission's valuation confirms the worth of their holdings. The only ones who will suffer will be the shippers, consumers generally and railroad employees themselves.

"It should also be remembered that under government ownership there will be the same need for a steady flow of new capital into railroad investment as is required now. You cannot buy cars and locomotives, you cannot build new tracks, new terminal facilities and yards without money. You can't get this money from bankers; they haven't it to lend. They have to get it from people like ourselves,—from people who have savings to invest. The government could not finance itself on the meagre returns to which the railroads have been restricted. How could the government get the capital necessary to provide greater facilities under government ownership if capital will not take the risk of investing in the railroads under private operation?"

Taking up the personnel problem under government ownership, Mr. Whiter said: "During Federal control, labor reaped a reward far beyond the fondest hopes of its leaders. Wages increased by leaps and bounds until the average increases were about 120 per cent of our pre-war rates. No

one honestly disputes the fact that railroad employees were entitled to increased wages to meet the advancing cost of living, but, with these increases granted by the Railroad Administration, the loyalty of employees to their companies disappeared and their *esprit de corps* was seriously shattered. Discipline became difficult to maintain because the authority of the railroad official was greatly undermined by the action of the Railroad Administration officers overriding the railroad officers' authority and actually inviting labor leaders to come to Washington direct to have their so-called grievances adjusted.

"In the face of such a recent experience, it is not difficult to see why short-sighted leaders of railroad employees are anxious to bring about government ownership. It is certain that, if past experience offers any criterion, the labor leader's job will be more secure than ever, that there will be a quick return to the evils of standardized wages, standardized rules, lax discipline and multiplied grievances.

"I believe railroad officers are unanimous that, aside from the financial obstacles to be overcome, one of the greatest obstacles lies in their inability to deal directly with their own employees; to establish with them a satisfactory relationship and to secure their co-operation in running the railroads in the interests of the public. Yet the effort to accomplish this worthy end has been branded by those who ought to know better as an effort to break up and destroy labor unions. Nothing is further from the truth. All that railroad managements desire in that respect is to handle their own affairs in conference with their own employees and not through some outside agency. Government control brought on more strikes in 26 months than in any previous ten-year period."

Mr. Whiter then referred to the personnel relation on the Pennsylvania system. He said that no strike vote was taken by the shop employees of the Pennsylvania prior to the shopmen's strike which began July 1, 1921, but that about 22,000 or 23,000 shop employees out of the total of approximately 61,000 left the service on the ground that this action was justified by a strike vote taken in October, 1921, at the time court proceedings were instituted to determine whether or not ballots for employee representation were required to contain the name of the American Federation of Labor as well as the names of individual representatives. Since the strike was called, he said, the Pennsylvania had taken back approximately 9,000 of the strikers, who had come back as individuals, and there were now approximately 70,000 men in the shop crafts on the payrolls of the system.

"The fundamental fact," Mr. Whiter continued, "is simply this: The Pennsylvania and its employees in all classes of service have succeeded by joint efforts in establishing a mutually satisfactory means of settling amicably all disputed questions that may arise between management and men. This plan has withstood the most severe tests to which it could be subjected. * * * Union, as well as non-union employees have given it their sanction and support. I may say without hesitation that the relationship between Pennsylvania officers and Pennsylvania employees is today more cordial and co-operative than ever before in the railroad's history and that a further advance has been made on our railroad in establishing a peaceful relationship than on any other railroad, to the best of my knowledge.

"Now this situation is not one that the public can afford to overlook. With railroad income and outgo so largely

controlled by government authority, a very narrow margin remains on which management may exercise its discretion, ingenuity and initiative in order to make its service more attractive. In the public interest, it is absolutely necessary that we secure the loyalty and co-operation of our employees and that cannot be done under conditions which encourage strife, which lead inevitably to nationalized wages and working conditions and disloyalty to the company which employs them."

After drawing attention briefly to the restrictive and burdensome regulation imposed on the railroads by national and state commissions as the cause of the outstanding difficulties of the railroads today, Mr. Whiter continued:

"Whether people have good railroad service or bad, whether facilities are adequate or inadequate, whether rates are reasonable or unreasonable, are all matters that are entirely in the hands of the people themselves. If they want good railroad service, adequate railroad facilities and reasonable rates, it seems to me that what they should do is very clear. They will not get those things, however, by sitting idly by and letting the railroad baiters, in and out of Congress, work their will with this twenty billion dollar business.

"Most of the men in this room, I take it, are railroad men. The job that confronts the American people, however, as far as railroads are concerned, is not a job for ourselves alone. We know the facts. It is up to us to make certain that every one with whom we come in contact also knows the facts and acts upon them. People generally assume that government is an intangible something. As a matter of fact, those who constitute our government are human beings, subject to the will of all our citizens. All that is necessary is that the will of our citizens be made known in a vigorous, unmistakable way. Let the railroad men who see clearly the effects of the present government attitude toward the railroads make every effort to get the situation clearly understood by the voters in their territories. If the votes of the people who elect our government representatives are made to count for a square deal for the railroads, you can be certain that is what the railroads will get and the railroad problem will be much nearer a solution."

The Railroads' Appeal to the Business Man*

By Elisha Lee

Vice-President of the Pennsylvania Railroad

WHAT TAKES PLACE in the Congress which assembles next fall will certainly play a very large part in shaping our transportation policies for a long time ahead. It is in the highest degree essential that sanity and wisdom shall prevail. We are reassured by certain clear and steady rays of light. The constructive interest which business men everywhere are taking in railroad affairs is a most encouraging sign. Where can we turn for help and support save to those who realize that their own true interests are bound up with ours? Both agriculture and labor for the time being are in unsafe hands politically, and a united stand by our business men and their organizations is the only effective force at present available to save our transportation policies from receiving their final shaping largely at the hands of radicals. A campaign of conscious misrepresentation and unfair attack is being conducted against the railroads for political effect and ends. The purpose behind it all is to precipitate government ownership of the railroads

as a first step toward destroying our representative form of government and plunging us into socialism.

The men behind this movement realize that on any fair referendum of the people government ownership would be buried. What they are doing is attempting in crafty and subtle ways to bring about such a state of confusion and chaos in railroad affairs, that government ownership will be the only way out. We must be prepared to see this movement take definite shape in the next Congress. The danger will not lie in any appeal to intelligence or sincerity, but rather in the possibility that advantage might be taken of the known weaknesses of our political system to bring about a stampede, through fear and hysteria, into some ill-considered and bitterly to be regretted action.

Circumstances have given to business a rightful place of leadership in our country today and business in general has common cause with the railroads against the radical forces of destruction. Conditions have made the railroads the first target of radicalism, but confiscation of the railroads is merely a first step, to be followed by like action with respect to the basic industries, in reaching the true goal of radicalism, which is social revolution. A small body of citizens really believe in government ownership and would pay in full for the property taken, but they lack numbers, and their influence is chiefly of consequence for the unwitting aid and comfort which it gives to the true radicals, who happily are only a small minority of the population. But they are tireless, relentless and resourceful, while the mass of our people often incline toward tolerance, good nature and complacency to a dangerous degree.

I have not forgotten the farmer. Unfortunately, however, the farmers are at present—we trust only temporarily—to a large extent influenced by political leadership, which, with respect to the railroads, is publicly committed to the course of killing the goose that lays the golden eggs. It is indeed one of the strangest phenomena of our times to contrast the dignified and conservative farmer with some who claim to be his spokesmen at Washington. I, for one, refuse to believe that they speak for him rightfully; but for the time being, he is allowing the claim to go unchallenged. Has the farmer stopped thinking for himself? Not permanently, I am convinced.

As matters stand at present, however, the country must continue to look chiefly to the leaders of business for constructive thought. What is the railroad problem? * * * It is an immensely complicated thing. Few people seem to realize the amazing speed with which the demands, needs and uses for transportation have grown and are growing. In the last two decades our population has increased only about 20 per cent, but the public service rendered by our railroads has trebled. Yet with the 12,000,000 automobiles and 48,000 miles of electric tracks, and all the great increments to the means of transport, it is common knowledge that we have encountered a nation-wide shortage of transportation every time in recent years that our commerce has become active and prosperous. Everyone here knows that transportation famines act as automatic checks to prosperity whenever they occur.

The chief need is to pave the way for a general and progressive expansion of the capacity of our railroad machine. That can only be made possible by allowing the railroads again to prosper and earn real profits, which are the only sound basis of credit. If $5\frac{3}{4}$ per cent was all that could be earned from manufacturing, jobbing, retailing, banking, or ocean transportation, would Boston be the great center of industry and commerce that it is today? By saving at the spigot the public may cut off some millions of dollars a year in railroad charges, but at the bung hole they will waste billions in lost production, trade, employment and profits.

Business men should insist upon the repeal of the present unduly restrictive laws which prevent management from performing its proper functions. Unless they are ready to adopt

* Extracts from an address before the Traffic Club of New England at Boston, March 20.

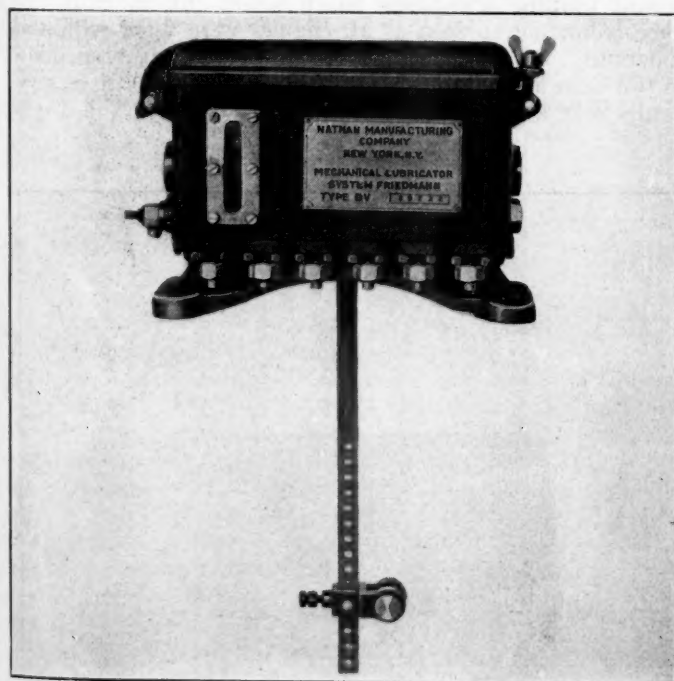
some such program as this, they must be prepared to see the railroads scrapped preparatory to government ownership, and service and rate-making manipulated primarily with the purpose of procuring votes. Have you ever stopped to consider what government ownership would mean? Would you like to see a national election turn upon some such question as whether the manufacturers should pay the principal part of the freight bills of the farmers or vice versa? Can any thoughtful man believe it would be desirable, or even safe, to increase the existing army of our government employees by 2,000,000 railroad workers, the great majority closely knit together into strong unions? Nor must we forget their wives and daughters, probably a million more votes.

The speaker went on to summarize the statistics of the enormous traffic carried by the railroads during the past few months; he also explained the unrest among railroad workmen and told of the marked success of the Pennsylvania Railroad's plan of dealing with employees through joint committees. Concluding, he said:

"The people of our country must stop pulling apart and begin pulling together. That means all factors in the nation—business, agriculture, labor, politics—because our interests are mutual and not opposed. If that purpose is achieved I, for one, have no fear for the future of our American railroads or their ability to serve adequately and magnificently the transportation needs of the nation."

Mechanical Locomotive Lubricator

THE TYPE DV mechanical locomotive lubricator, illustrated, is made by the Nathan Manufacturing Company, New York City. It is a development of the Friedman lubricator, of which more than 60,000 have been applied to European locomotives. This lubricator is valve-



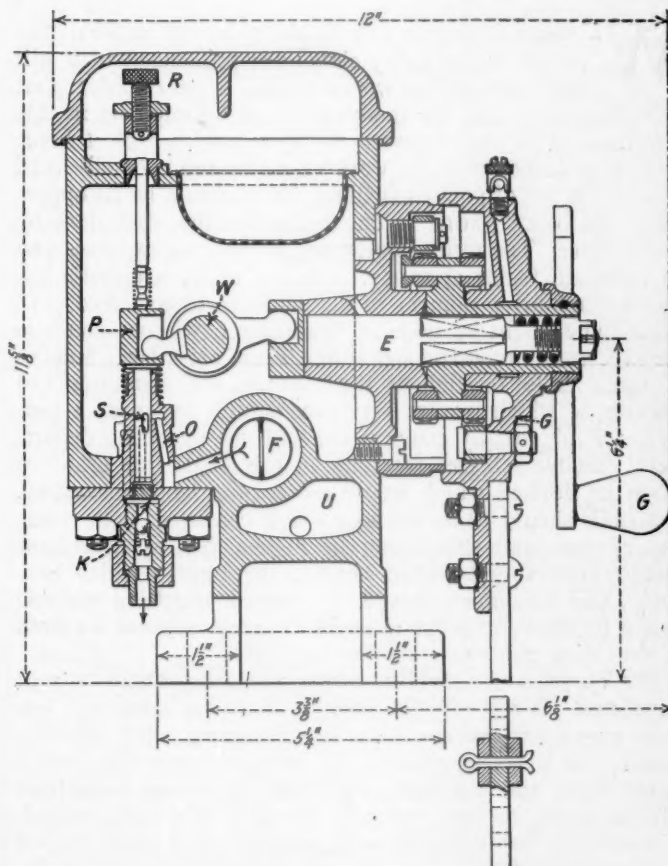
Nathan Type D V Valveless Mechanical Lubricator

less, the operation of its working pistons or plungers being independent of the action of check valves. Inside the oil reservoir there is a separate valveless pump for each feed. This pump, consisting of a plunger which in its highest and lowest position automatically opens and closes the oil inlet

opening and oil outlet opening through a turning movement of the plunger, eliminates all suction and discharge valves.

The operating movement of the mechanical lubricator is taken from some point on the motion work of the engine where the stroke is fairly constant, so that the set movement of the lubricator will not be influenced by variations in cut-off of the engine. A useful auxiliary of this device is an indicator which shows at a glance whether the oil pipes are filled with oil at the proper pressure.

The Nathan mechanical lubricator may be obtained with two forms of terminal check, one for use when the oil is being delivered to the steam pipes and the other for applications in which the oil is delivered into the cylinders. The lubricator is simple in operation requiring little attention. The engine crew and roundhouse men have only to keep it filled with oil. The correct rate of oil feed is permanently set by



Cross-Section Showing Operating Parts of Mechanical Lubricator

the mechanical department. The engine starts the lubricator and the engine stops it.

The operation of this lubricator will be evident from the drawing. The crank disc on the end of the ratchet shaft *E* contains a circular hole which receives the ball end of the rocker arm attached to the shaft *W*, so that as the ratchet shaft rotates the vertical component of the circular motion of the hole causes the shaft *W* to oscillate while the horizontal component causes the shaft to slide back and forth. These oscillating and reciprocating motions are definite since the arm is rigidly attached to the shaft *W*. These two motions are utilized to operate the plungers for pumping and for the control of admission and discharge of oil. Each plunger is operated by a small arm rigidly attached to the shaft *W* acting on a cross head-like extension of the plunger *P* which is provided with an elongated slot. The upward motion of the plunger is effected by means of a spring below the cross head, and downward motion is effected by the small arm attached to

the shaft *W* coming in contact with the bottom of the slot in the cross head. The turning movement of the plunger causes a groove *S* in the plunger to make connection from the plunger cylinder to the suction chamber *O* at the up-stroke and with the discharge chamber *K* on the down-stroke. The up-and-down motion of the plunger may be observed through the small chamber below the regulating screws, an extension rod being attached for that purpose to the top of the plunger.

The Signal Engineer in England —Automatic Train Control*

By R. J. Insell

President of the Institution of Railway Signal Engineers

WE SHOULD DEVOTE OURSELVES to seeing in what way we can devise safety signaling appliances which will effect economy in working costs. I am confident that there is a great field for the studious signal engineer in this direction. With the increased distance (which will, I hope, shortly be authorized) for working points mechanically, and also by the use of power machines, there should be an opportunity for concentrating in one signal-box the work done by two or three. The result is economy in working expenses and an increased factor of safety. The use of track circuits has already enabled a number of signal-boxes to be closed, and much more might be done in this respect, without going to the expense of automatic signaling. There are a large number of single lines throughout the country, the signaling and working of which involve very considerable expense. I venture to think that by co-operation with the operating department, suitable schemes for some of the single line branches might be devised which would effect considerable economy.

Signals should be as few as possible consistent with traffic requirements and should not be higher than is necessary; should invariably be fixed next to the line to which they apply, and our efforts should be directed to getting suitable spaces for them, in order to avoid the great expense involved in providing gantries spanning the lines.

The question of providing power signaling should be well considered. It will often be possible to do the work with one man where two or more are now required. By effecting economy it may be possible to provide money for power signal-boxes and automatic signaling, which on some lines will, no doubt, become urgent in the event of a trade revival.

Automatic Train Control.—I have taken a keen interest in this subject for many years, and think we are greatly indebted to the Ministry for enabling such an excellent report to be drawn up and published. We now know the official view of the requirements, and the principles which should be applied. The committee came to the conclusion that "control at stop signals is of first importance." With this I am afraid I must disagree. It can confidently be assumed that in the event of train control being provided at the distant signal, giving a "danger" indication with partial brake application, the stop signal ahead would not be passed in the "danger" position, except under extraordinary circumstances.

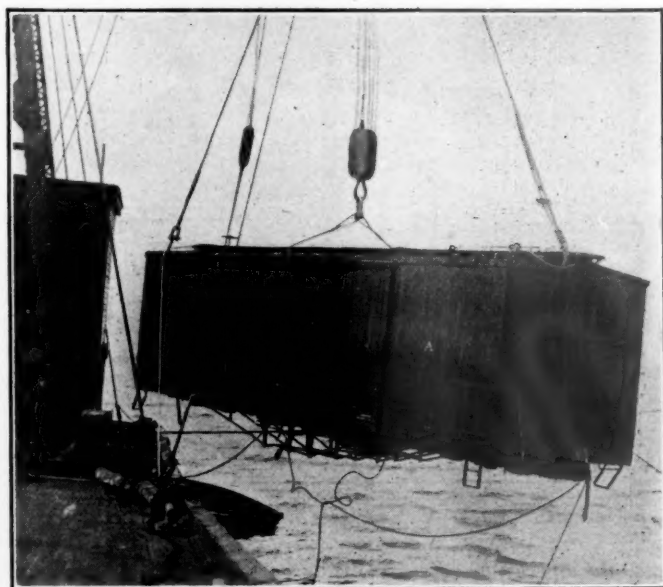
Section IX of the report refers to the views held by engine-men on the question whether it is objectionable to take control out of the hands of the driver when his engine passes a stop signal at danger. Is it at all likely that an engineman would admit that he was in the habit of passing signals in the danger position? How, therefore, expect him to object to the control of his engine being taken from him under such

improbable conditions? The question which might more properly have been put would have been: "Where you are in the habit of receiving an audible indication and partial brake application at a distant signal, is it possible to assume that you would be likely to pass the stop signal ahead at danger?" Can we doubt the answer which would be given?

Assuming, therefore, that train control is provided at a distant indication, we should recognize the fact that for trains running at speed we have done all that is necessary for the present. This would leave us with those cases, far too frequent, of a train starting from rest against the signal. Such cases are likely to cause serious accidents, as they may foul the path of a train running at high speed, but I venture to think that it would be more satisfactory and economical to deal with such cases by the provision of catch points, rather than train stops. These catch points need not be a source of danger to any train, except when starting from rest against the signal, as it can be arranged for the catch point to be closed and locked before a train could be accepted from the rear. Such an arrangement would enable existing traffic facilities to be maintained, and so avoid the curtailment of space which the provision of a train stop must of necessity bring about. With the provision of such safeguards it is probable in the future that many such accidents, if not all, would be avoided.

Now a word as to the cost of carrying out the recommendations of the committee. I quite understand that the huge figures quoted are only approximate, but that the cost must be heavy cannot be denied. How is the expenditure to be justified? So far as we can see, the saving in cost of accidents will not do this, and if we are to consider how it is to be done, we must see in what way economy can best be effected in the existing signaling system, which will to some extent balance the expenditure about to be incurred.

In my opinion this can be done by dispensing with the existing form of distant signals. Given a satisfactory system of train control at full braking distance from each home signal, there seems to be no valid reason for retaining the present warning semaphore, which would automatically become redundant so soon as all engines were fitted with the apparatus. As a matter of fact, this has already been done on two branch lines [of the Great Western] with satisfactory results over a period of years.



P. & A.

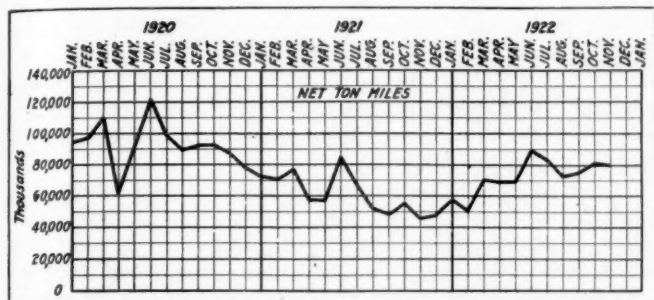
Raising Cars from the Hudson River, New York City, After Sinking of a Car Float

*From an address given at the meeting of the Institution in London on February 14 when Mr. Insell assumed the presidency. He is chief assistant signal engineer of the Great Western Railway, and one of the four engineers responsible for the audible cab signals introduced on that road about 16 years ago. The Great Western now has cab signals and automatic stops on a large number of passenger locomotives.

El Paso & Southwestern Earnings Improve

Increased Activity in Copper Mines Will Be Reflected in Better Net During the Present Year

THE EL PASO & SOUTHWESTERN perform two functions of radically different character. It was originally built to serve as an outlet for the copper mines operated in New Mexico and Arizona by the Phelps-Dodge interests and its stock is owned by people associated with these interests. In addition to serving as such an outlet, it forms—or more particularly, its line from Tucson, Ariz., to Tumacacari, N. Mex., forms—a link in the trans-con-



El Paso & Southwestern Traffic

tinental route constituted by lines of the Rock Island, the E. P. & S. W. and the Southern Pacific. Its position as such a link gives it an importance or interest which possibly it otherwise might not have. In the Interstate Commerce Commission's tentative consolidation plan, this route is included in System No. 17, the Southern Pacific-Rock Island group. Hearings on this system were held in Washington recently and were reported in the *Railway Age* of March 3. The El Paso & Southwestern mileage totals 1,140. The

CONDENSED EARNINGS STATEMENT OF EL PASO & SOUTHWESTERN

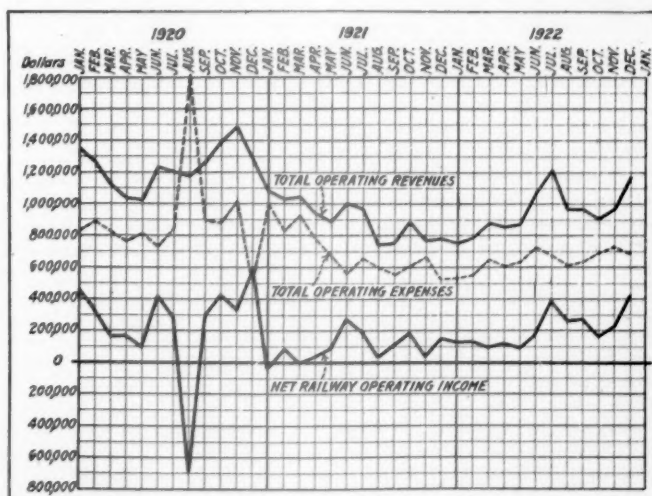
	1922	1921
Freight revenue	\$8,782,801	\$7,946,710
Passenger revenue	1,905,895	2,270,721
Total operating revenues	11,384,185	10,910,087
Maintenance of way and structures	1,817,892	1,920,360
Maintenance of equipment	1,882,164	2,236,117
Traffic	354,066	330,605
Transportation	3,006,954	3,299,908
Total operating expenses	7,741,154	8,420,674
Operating ratio	68	77.18
Net operating revenues	3,643,031	2,489,413
Net operating income	2,504,690	1,165,688
Net after fixed charges	2,491,364	1,176,312
Dividends	1,875,000	2,000,000

so-called western division includes a line from Tucson, Ariz., to El Paso, Tex., parallel to, although at some distance from the line of the Southern Pacific between the same points. From this line there are various branches serving operations of the Phelps-Dodge interests. The eastern division includes the line north from El Paso to Tumacacari, where connection is made with the Rock Island. From Tumacacari northwest the line extends also to Dawson. The mines for which the road serves as an outlet are at Clifton, Ariz.; Bisbee, Ariz.; Nacozari, Mex.; Douglas, Ariz.; Tyrone, N. Mex., etc. At Dawson, N. Mex., at the northern end of the line, are also extensive coal operations. The traffic from the copper mining operations on the western division moves in the form of copper bullion eastward to El Paso, where it may be turned over to connections for rail and water movement to refineries at Baltimore or New York, via Galveston or New

Orleans. A fair volume of the tonnage moves all-rail through the Tumacacari gateway. In normal years over one-half the road's traffic is products of mines or mine supplies, the two largest items being ores, constituting about 30 per cent of the total revenue tonnage, and coal, making up about 15 per cent.

An important part of the tonnage moving by what is termed the Southwestern route constituted by the S. P., E. P. & S. W. and C., R. I. & P., is the traffic in California fruits and vegetables. Products of agriculture make up about 15 per cent of the road's total tonnage, and one of the most important commodities is canteloupes. The traffic in melons covers about six weeks in June and July which explains why it is that net ton-miles in June usually mark the high point of the year. In 1922 there were handled over the El Paso & Southwestern approximately 12,000 cars of melons, the larger part of this traffic not being received at El Paso as usual but at Tucson. The road receives considerable other agricultural traffic besides that moving over the route followed by the Golden Gate limited. Irrigable lands are rapidly being brought into cultivation—notably in the Salt River valley district around Phoenix, Ariz.—and are offering a gradually increasing traffic in high grade products.

Because of the importance which copper ore plays in El Paso & Southwestern traffic, it is to be expected that the gross and net earnings of the property should vary in almost



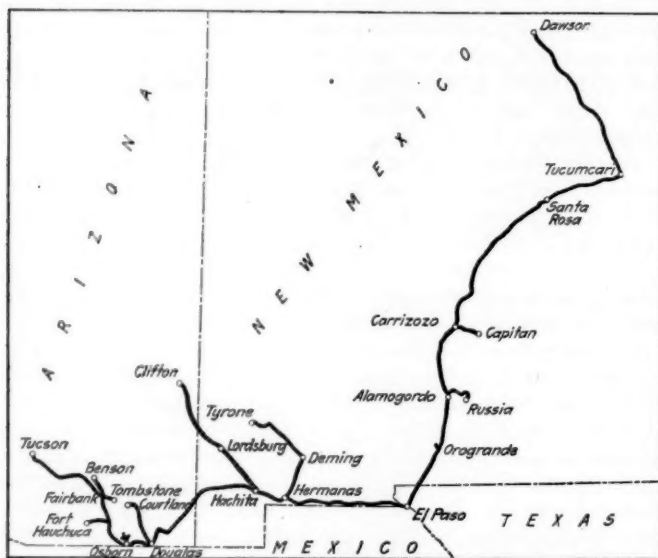
E. P. & S. W. Revenues and Expenses, 1920 to 1922

direct ratio with the activity of the copper industry. For the past two years the industry has been relatively slack. At present it is picking up rapidly. The El Paso & Southwestern, as a result, has reported comparatively unfavorable gross and net earnings but just now its traffic and operating revenues are picking up to an extent to promise much improved results in 1923.

In 1922 the road carried 3,393,712 tons of revenue freight. In 1921 its revenue tonnage was 2,469,474, but in 1920 the figure was 4,692,401. The increased traffic in 1922 as compared with 1921 permitted much improved net earnings but not earnings on a parity with those years in which a more normal traffic was moved.

The property in 1922 had a net operating income of

\$2,504,690, or more than double the figure of \$1,165,688 reported in 1921. The improvement was the result of an increase of some \$500,000 in total operating revenues combined with a decrease of approximately \$700,000 in total operating expenses. Although the net after rents in 1922 was more than double that for 1921, this did not succeed in putting the road back on a pre-war basis of earnings. For



The El Paso & Southwestern

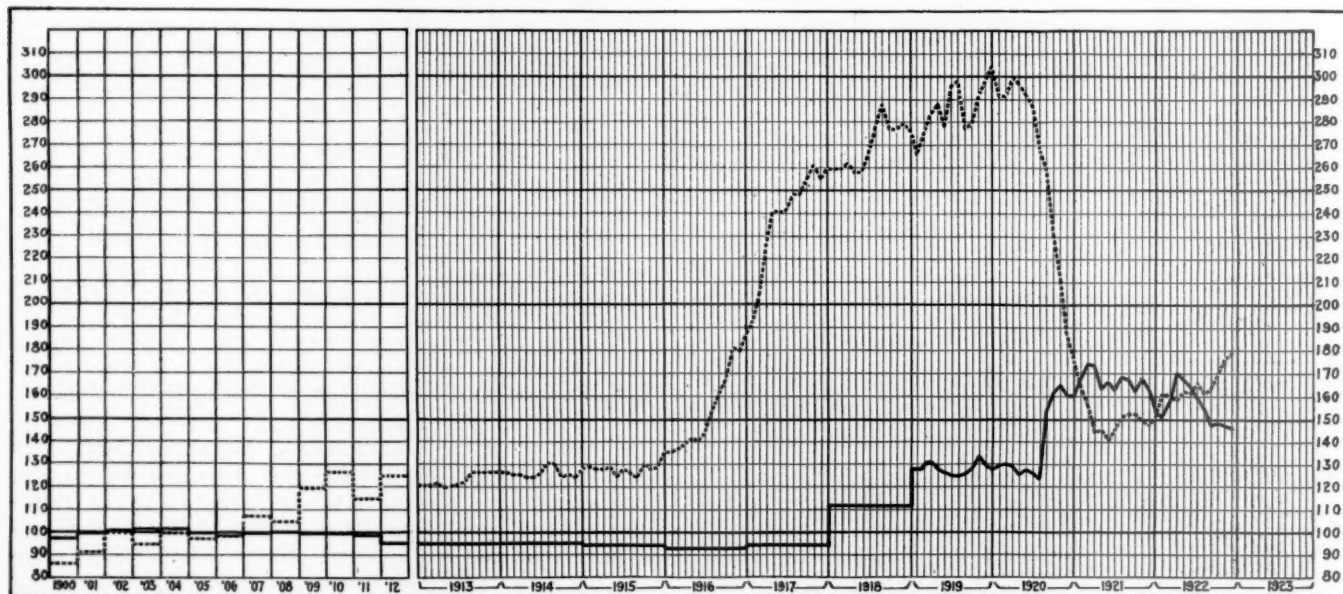
instance, the standard return based on the average net operating income for the three years ended June 30, 1917, was \$4,145,102. In 1918 the road earned for the government a net operating income of \$4,945,206 and in 1919, \$2,993,415. In 1920 it had a net operating income of \$2,850,924.

The total operating revenues in 1922 were \$11,384,185 as compared with \$10,910,087 in 1921. Operating ex-

penses totaled \$7,741,154 as against \$8,420,674, and the operating ratio was reduced to 68.00 in 1922 from 77.18 in 1921. The road does not seem to have been very severely affected by the shopmen's strike. Equipment conditions at present is favorable. On February 1 bad order cars totaled only 5 per cent, locomotives held out of service for repairs were 21.7 per cent—slightly over the country's average. There were 16 locomotives stored. The road started the strike on July 1 with only 11.5 per cent of its locomotives unserviceable. The highest figure reached was on November 15, when 26.8 per cent was reported. In 1922 the El Paso & Southwestern had an average net tons per train of 498. Its car miles per day reached 40.3. It is of special interest that its transportation ratio was only 26.3 per cent.

Corporate net after fixed charges in 1922 was \$2,491,364 as compared with \$1,176,312 in 1921. The company is now paying 6 per cent dividends, amounting to \$1,500,000, so the dividends were earned handily even with the comparatively low net earnings. The El Paso & Southwestern formerly paid a higher rate on its stock, 8 per cent having been paid for several years prior to 1920. In 1921, 7½ per cent was paid, the rate having been reduced in the last quarter from 2 to 1½ per cent.

The El Paso & Southwestern should be able to report a much better year in 1923 than it did in 1922, how much better depending upon business conditions in general and the demand for copper in particular. The road has apparently reduced its expenses to an extent that will permit it to derive full benefit from any expansion of traffic. The company plans in 1923 to spend about \$850,000 for additions and betterments. It will lay 60 miles of 90-lb. rail in place of 75 and 80 lb. About 30 or 35 per cent of its mileage is at present laid with 90-lb. rail. It will put in track about 140 miles of crushed rock or slag ballast; \$150,000 is to be spent for shops and \$100,000 for improved water supply. Orders have been placed for 4 passenger train cars for delivery about June. Later in the year it may be necessary to order some additional freight equipment.



Reproduced from chart prepared by the Bureau of Railway Economics

Relative Receipts Per Ton-Mile Compared with Relative Prices of Farm Products (Average 10 Years 1900-1909=100)

THE FULL LINE shows the relative receipts per ton-mile obtained by converting actual receipts per ton-mile, as recorded by the Interstate Commerce Commission, into index numbers based upon the average of the ten years, 1900-1909. Receipts per ton-mile, for the years 1900 to 1915, are reported by the Interstate Commerce Commission on a fiscal year basis (years ending June 30), and for subsequent years on a calendar basis (years ending December 31). In order to have the averages on a comparable basis throughout,

the fiscal year returns were converted to a calendar year basis by the method indicated in the following example: The calendar year figure for 1900 was obtained by taking an average of the two fiscal years 1900 and 1901. Monthly average receipts per ton-mile are not available prior to March, 1919.

THE DOTTED LINE shows the relative prices of farm products obtained by converting the wholesale prices of farm products reported by the Bureau of Labor Statistics, U. S. Department of Labor, into index numbers based upon the average of the ten years 1900-1909.

General News Department

The Brotherhood of Locomotive Engineers' National Bank, Cleveland, Ohio, is to establish a branch in Buffalo, N. Y.

A. H. Armstrong of the railway supply department of the General Electric Company, Schenectady, N. Y., will speak on "Electric Power and its Relation to Transportation of the Future" at the annual dinner of the Cleveland (Ohio) Traffic Club on April 5.

The Pacific Railway Club, San Francisco, at its eighth annual meeting on March 8, elected officers for the ensuing year as follows: President, J. N. Clark, Southern Pacific; first vice-president, J. M. Yount, Market Street Railway; second vice-president, H. A. Mitchell, San Francisco-Sacramento Railroad; treasurer, R. G. Harmon, Western Pacific. William S. Wollner continues as secretary.

George K. Roper, Jr., who for some years has been related to the work of the Young Men's Christian Associations in the South and Central Eastern regions, has succeeded E. L. Hamilton, recently retired from the senior secretaryship of the Transportation Department of that organization. Mr. Roper brings wide experience to his new responsibilities and possesses qualities that ensure a wise and efficient administration of this important work.

Three passengers killed was the result of a derailment on the Quebec Central near Beauceville, Que., on March 12. From some cause not ascertained, two coaches left the track, while the train was moving at regular speed, and fell down a bank and caught fire, the cause of the fire being, it is said, the oil lamps in the cars. The train was northbound passenger No. 5. The victims, two women and one child, were trapped in one of the burning cars; other passengers escaped with minor injuries. This is said to have been the first fatal passenger train accident on this road in 40 years.

Annual Meeting of Transportation Division

The Transportation Division of the American Railway Association will hold its annual meeting at the Blackstone Hotel, Chicago, on Wednesday, April 25. Reports will be presented at this meeting by the general committee and by the committees on Car Service; Demurrage, Storage, Reconsignment and Diversion; Freight Handling Service; Railroad Business Mail and Records.

Special Session of A. R. A.

A special session of the American Railway Association is called, to be held at the Yale Club, Vanderbilt avenue and 44th street, New York City, on Thursday, April 5, at 10 a. m., for the consideration of important matters of policy and program for meeting the transportation requirements in 1923.

The meeting will adjourn in time for the meeting of the Association of Railway Executives, called for 1:30 p. m. at the same place.

Railway Problems to Be Discussed

by National Chamber of Commerce

Transportation will be one of the major topics for discussion at the annual meeting of the United States Chamber of Commerce at New York on May 7-10. Some of the phases to be discussed are: Railway Rates in Their Relation to Distribution, including Store Door Deliveries and Collections and Transportation Obstructions to Distribution, and The Effect of Freight Rates on Manufacturing Costs.

A survey of railroad financing problem both from the viewpoint of the railway executive and of the security holder has been mapped out for the finance group meetings, with expansion of the topic into the fields of agricultural credits, tax exempt securities

and similar related financial problems. The insurance group will consider Insurance Investments in Railroads and the problem of insurance executives in determining the percentage of yearly assets to be put in railroad securities.

More Candidates for Excursion to France

The Long Island Railroad has joined the movement to send representatives to France as members of the National Good Will Delegation, which is to leave New York on May 23. These women go as guests of the American Committee for Devastated France. Placards have been posted all along the line of the railroad asking employees, and everybody, to vote, early and often, for Miss Kittie Donnelly. The Long Island Railroad has about 9,000 employees and to assure Miss Donnelly a place in the delegation it will be necessary to contribute 60,000 votes, at 10 cents a vote. Miss Donnelly was born on Long Island and has been in the service of the railroad company since 1897 as ticket agent and telegrapher. She is now in the Motive Power Department at Morris Park.

The Lehigh Valley announced on March 21 that Miss Helen E. Strimple would be the candidate of that road. She is a clerk at Pier 8, N. R., New York, and has been in the road's employ eleven years.

Railroad Session at Spring Meeting of A. S. M. E.

During the Spring Meeting of the American Society of Mechanical Engineers, which this year is being held at Montreal, Quebec, the Railroad Session will be held on Tuesday morning, May 29, 1923.

Papers of more than ordinary interest at the present time are being prepared and will be presented. One paper entitled "Construction of Steel Frame Box Cars by the Jig Method," is to be presented by H. R. Naylor, assistant works manager, Canadian Pacific, Angus shops, Montreal, Quebec. The paper will be descriptive of the modern methods employed at this shop and fully detail the jig method of car construction which marks a definite step forward in the building of railway cars. The author has done a great deal in the development of this method and is fully qualified to present the topic.

The paper on Railroad Motor Cars by C. E. Brooks, chief of motive power of the Canadian National Railways, Toronto, Ont., promises to be of more than ordinary interest. The Canadian National Railways have tested out a large number of cars of this character and experiences with, and qualifications of, various designs will be given.

Fuel Organization Organizing Local Chapters

Periodical meetings in the principal railroad centers to stimulate interest in fuel matters is one of the activities recently undertaken by the International Railway Fuel Association. In December, 1922, President J. N. Clark, acting upon authority of the Executive Committee, requested members in some of the larger railroad centers to organize district chapters. This work is now being carried forward and the District of Columbia Chapter, which was organized on January 10, 1923, has already held two meetings. The subjects discussed by this chapter included: Forms of Fuel Contracts; Practicability of Fuel Purchase on Specification Basis; Methods of Fuel Distribution by Direct Consignment from Mines to Coaling Station and Otherwise, and Supervision of Locomotive Operation. The Chicago District Chapter held a meeting on March 12 at which W. E. Dunham, assistant superintendent motive power and machinery of the Chicago & North Western, presented a paper on Cold Weather Practices as Related to Fuel Conservation. Each section will be allowed to work out its own program for the discussion of problems of local and general interest. It is thought that by

holding informal meetings each thirty or sixty days, the members will be able to carry out the objects of the organization to better advantage and promote the best methods for fuel economy in their own territory.

Railway Returns for January

The Interstate Commerce Commission's summary of the revenues and expenses of class I railroads is as follows:

	January	
	1923	1922
Average number of miles operated.....	235,587.26	235,341.07
Revenues:		
Freight	\$366,720,615	\$277,112,248
Passenger	191,102,676	283,736,441
Mail	7,463,222	7,382,020
Express	10,891,444	6,559,795
All other transportation	15,285,440	12,130,722
Incidental	10,055,141	8,413,120
Joint facility—Cr.	837,647	616,466
Joint facility—Dr.	195,729	173,379
Railway operating revenues.....	562,160,456	395,777,433
Expenses:		
Maintenance of way and structures.....	52,834,350	48,714,722
Maintenance of equipment.....	122,952,582	93,636,110
Traffic	7,472,603	7,176,767
Transportation	208,469,186	171,296,092
Miscellaneous operations	4,117,677	3,689,253
General	13,524,147	13,535,437
Transportation for investment—Cr.	555,993	416,291
Railway operating expenses.....	408,814,552	337,632,090
Net revenue from railway operations.....	93,345,904	58,145,343
Railway tax accruals	25,208,598	22,798,138
Uncollectible railway revenues	95,692	81,726
Railway operating income	68,041,614	35,265,479
Equipment rents—Dr. balance.....	5,770,600	4,120,443
Joint facility rent—Dr. balance.....	1,396,622	1,513,410
Net railway operating income.....	60,874,392	29,631,626
Ratio of expenses to revenues (per cent).....	81.41	85.31

¹ Includes \$2,773,704, sleeping and parlor car surcharge.

² Includes \$2,256,210, sleeping and parlor car surcharge.

Master Boiler Makers' Convention

The fourteenth annual convention of the Master Boiler Makers' Association will be held at the Hotel Tuller, Detroit, Mich., May 22-25. A special committee, of which Leonard C. Ruber is chairman, will report on rules for standards and recommended practice. The other topics which will be reported upon with the names of the chairmen of the committees, follow:

"Are the new combustion chamber boilers as easy to maintain as the straight standard firebox?" Henry J. Raps, chairman.

"Finished material (boiler plates) should be sound and free from cracks, surface flaws and laminations, and no hammer dressing, patching, burning or electric welding is allowed." Charles P. Patrick, chairman.

"What are the best methods of detecting defective boiler sheets in the shop before going to the laying out bench and being put into service?" John J. Keogh, chairman.

"Hammer testing of staybolts on our modern locomotive boilers is now one of the most important duties of local boiler inspectors. What is the most up-to-date hammer for testing staybolts? Give shape and weight. Is it better to hammer test staybolts while the boiler is empty or when it is under hydrostatic pressure?" J. A. Holder, chairman.

"What is the standard method of applying flues in locomotive boilers; also in stationary boilers? Give each item separately in its regular order: (1) How should ends of flues be prepared? (2) Preparation of flue holes in sheets. (3) Copper ferrules, thickness and width. (4) Give length of flue projecting through sheet at both ends. (5) Tightening flues in sheet. Give standard tools for rollers, prosser tools, beading tools." Albert F. Stiglmeier, chairman.

"Is the use of automatic stokers on locomotive engines injurious to the firebox sheets? Do the firebox sheets crack more readily in a stoker-fired engine than in a hand-fired locomotive?" H. A. Bell, chairman.

"Care of water-tube stationary boilers." J. J. Davey, chairman.

"Steam leaks and the bad effects on the boiler plate." D. A. Lucas, chairman.

"The life of the superheater tube and the number of safe-ends that should be applied before they are cut down for a smaller boiler." J. P. Malley, chairman.

"What experience has been had in connection with the electric weld heater?" John W. Holt, chairman.

The Pennsylvania and Its Employees' Committees

The Pennsylvania Railroad has issued a report of the operation of its plan of employee representation for the peaceful determination of controversial questions arising between employees and management. The great majority of these questions are settled amicably and satisfactorily in the regular monthly conferences between the local representatives of the employees concerned and the local supervisory officers. The number of cases received by the reviewing committees during the year was less than 5 per cent of the total. The total number of questions arising over the interpretation and application of rules, discipline and pay practices, was 4,532, but it was found necessary to take up only 297 of these with the general managers. Of all the cases taken up with the local officers, the division superintendents, general superintendents and general managers, 50.6 per cent were adjusted or compromised in favor of the employees; and cases withdrawn at various stages of the discussion were 26.8 per cent of the total.

The total number of disputed questions received by the reviewing committees during the year was 223. These committees meet monthly. They consist of equal representation of officers and employees, the chairmanship alternating between them every six months. All the members have equal voting power and two thirds vote is necessary to decide any issue. Of these cases 100, or 44.9 per cent, were decided in favor of the management; 55, or 24.6 per cent, were decided in favor of the employees and 68 or 30.5 per cent were withdrawn or remanded. Since the reviewing committees were established, it has been found necessary in only one case to refer the matter to any other agency. In that instance, the Joint Reviewing Committee of the engine and train service employees decided to refer a disputed question to a board of three arbitrators, one appointed by the conductors, one by the management and one by the two so appointed.

N. Y. C. Ordered to Pay Hourly Instead of Piece Rates Retroactive to 1921

Shop employees of the New York Central who have been on piece work schedules since November, 1921, must be paid on an hourly basis under the terms of a decision handed down by the Railroad Labor Board on March 22. The Board's ruling also provided that the employees affected should be compensated for the period of time that they were paid on piece work schedules at a wage rate "the average of which shall not be less than the hourly rates established by the decisions of the Board relating to such employment."

This ruling upholds the contention of representatives of the shopmen involved, who contended that the piece work schedule was introduced without proper negotiation and that the Transportation Act had consequently been violated. The Board held that the piece work schedules were not in conformity with the Transportation Act "because the employees were deprived of the right to negotiate such an agreement through their duly authorized representatives."

The minority members of the Board announced their intention to file a dissenting opinion and the majority members of the Board on this decision have likewise announced that they will file a supporting opinion if necessary. A second decision announced by the Board provided for the payment of the monthly salary scheduled for the particular type of work clerical employees may be assigned to do. This ruling issued as an interpretation of Decision 147 disposes of questions arising when employees not under the technical rating of clerks are transferred or promoted to such work. The Board asserted its belief that in promoting an employee from one position to another the carriers recognized the fact that the worker has acquired the necessary training to fulfill the duties of the position to which he is promoted. Consequently, it declared, the employee should receive the rate schedule for such a job.

Traffic News

The Great Northern Railway has opened a new ticket office at Broadway and 42nd street, New York; M. M. Hubbert, General Eastern Passenger Agent.

L. S. McDonald, president of the Arkansas Traffic Association, Little Rock, Ark., was killed in an automobile accident at North Little Rock, Ark., on March 15.

E. C. Van Arsdell, business manager of the Traffic World, has been appointed Chicago representative of the P. A. Wetzel Company, Springfield, Ill., manufacturer of tariff files.

The Lion Oil & Refining Company, Kansas City, Mo., on April 1 will move its traffic and car accounting departments to its El Dorado (Ark.) office, and all work connected with these departments will be handled directly from El Dorado.

Because of the numerous requests for copies of the freight claim prevention talks which have been made public by radio, the Freight Claim Division of the American Railway Association is distributing copies of the messages sent out from radio station KDKA, Pittsburgh, Pa.

The city of Savannah, Ga., in the opinion of the Board of Trade of that city ought to have three traffic solicitors, one at New York, one at Chicago and one at Savannah, to see that a good volume of freight moves through that port; and at the request of the Board of Trade the mayor has appointed a committee of five aldermen to see if the city ought to support such an enterprise. It would cost probably \$15,000 yearly.

Freight claim payments on the Illinois Central in 1922 were less by \$1,216,594, or 49.6 per cent, than in 1921. Substantial reductions in the number of lost packages, delays in transit, robberies and damages in transit were reported by C. G. Richmond, superintendent of stations and transfers. The decreased amount paid in settlement of claims is partly due to the reduction in prices of commodities, but the appreciable reduction in the number of claims themselves was encouraging.

The Alaskan railroad will begin the operation of passenger and freight boats on the Tanana and lower Yukon rivers in Alaska this spring, according to an announcement by the Department of the Interior. The boats will start about the middle of May. Two stern-wheelers will run between Nenana and Holy Cross connecting with the railroad at Nenana. Arrangements have also been made for the carrying of the United States mails on the boats, the mail pouches to go by river steamer from Nenana to Holy Cross and then by motor boat to St. Michael.

The Traffic and Transportation Bureau of New Orleans, through its Board of Directors, has adopted a resolution, referring to the present situation of the railroads—with receipts too low to enable them to earn what the transportation act intended them to earn and with all kinds of unfavorable measures being proposed by national and state legislatures—and calling on everyone interested in efficient and economical transportation to declare themselves in public, and to enlist the co-operation of all agencies through which a more constructive public opinion can be developed; all to the end that actual conditions in the transportation world may be generally understood, and hostile legislation thus stopped.

Freight Stations in the United States; 78,045

The number of freight stations in the United States is estimated by the Bureau of Railway Economics in a bulletin just issued at 78,045. This figure is based on a count taken from the January number of the "Official List of Open and Prepay Stations" issued by the Southwestern roads. The count shows 39,029 stations with agents and 45,934 without agents, or a total of 84,963, from which 6,918 are deducted as representing duplication due to joint use of stations. The deduction is estimated on the basis of the percentage of stations jointly used on the lines of 34 roads from which special returns were secured. The bulletin gives the number by states.

Revenue Traffic Statistics for 1922

The railroads in 1922 handled 339,730,198,000 ton miles of revenue freight, as compared with 309,997,353,000 in 1921, according to the Interstate Commerce Commission bulletin of revenue traffic statistics. This was an increase of 9.6 per cent. Freight revenue was \$3,994,521,645, as compared with \$3,914,457,263. The average miles per revenue ton per road was 186.46 as compared with 188.47 in 1921 and the average revenue per ton mile was 1.176 cents as compared with 1.263 in 1921. The number of revenue passengers carried one mile was 35,507,222,000 as compared with 37,338,959,000 and the average revenue per passenger mile was 3.028 cents as compared with 3.088 cents in 1921. These figures cover 178 Class I roads, excluding switching and terminal companies.

Anthracite Shipments in February

Shipments of anthracite for February, 1923, as reported to the Anthracite Bureau of Information, Philadelphia, amounted to 5,951,713 gross tons, as compared with 5,239,014 gross tons during the corresponding month last year—an increase of 712,699 tons, or 13.6 per cent. Shipments by originating carriers were as follows:

	February, 1923	February, 1922	January, 1923
Philadelphia & Reading	1,206,538	1,160,685	1,381,359
Lehigh Valley	1,097,351	857,579	1,093,052
Central of N. J.	521,430	537,214	588,093
Del., Lackawanna & W.	957,612	755,923	1,038,719
Delaware & Hudson	629,514	670,323	741,739
Pennsylvania	483,466	402,762	596,989
Erie	712,210	492,262	750,277
N. Y., Ontario & W.	169,176	141,929	178,072
Lehigh & New England	174,416	220,337	303,522
	5,951,713	5,239,014	6,671,822

Short Lines Desire to Sell

Interchangeable Mileage Tickets

Nine "short lines," through a petition filed on their behalf by the American Short Line Railroad Association, have asked the Interstate Commerce Commission to include them in the list of railroads to issue interchangeable scrip coupon books. The list of roads required by the commission to issue such tickets is confined practically to Class I railroads, but these lines assert that they are in competition for passenger business with the Class I railroads and that it is not only desirable but necessary, in order to avoid the loss of a large amount of passenger traffic, that they be included in the commission's order. The short line association had filed a general petition on behalf of most of the short lines asking that they be exempted. The nine lines that do not wish to be exempted are: The Bamberger Electric; the Charlotte Harbor & Northern; the Electric Short Line; the Jamestown, Westfield & Northwestern; the Joplin & Pittsburg; the Kansas City, Kaw Valley & Western; the Salt Lake & Utah; the Susquehanna & New York; and the Waterloo, Cedar Falls & Northern.

Report of Bureau of Explosives

Colonel B. W. Dunn, chief inspector of the Bureau for the safe transportation of explosives and other dangerous articles, has issued the annual report of the bureau for the year 1922. The membership of the bureau now includes 485 railroads, with a total road mileage of 291,629. The total number of boxes of high explosives condemned as unsafe for transportation during the year was 28,485, and the number of routine inspections made aggregated 11,765. The number of boxes condemned, which is much larger than in former years, included 20,000 cases of picric acid condemned on account of the boxes being defective or not complying with the legal specification.

The total losses in transportation by railroad of explosives in the year under review amounted to one man injured and a property loss of \$75; though the total quantity of commercial explosives transported was 168,301 tons. This loss is much below the average of previous records.

The work of the Bureau of Explosives has been extended to cover the Freight Container Bureau of the American Railway Association; and this latter Bureau, engaged in making experiments on the strength of boxes and other containers, now engages the services of eight engineers. The appendices to the report include reprints of a great variety of instructive monographs which have been issued during the year.

Commission and Court News

Interstate Commerce Commission Commodity Rates Decided in Memphis-Southwestern Investigation

The Interstate Commerce Commission on March 15 made public a report of 134 pages, written by Commissioner Daniels, and an order of 21 pages, on the commodity rate section of its Memphis-Southwestern freight-rate investigation, a proceeding, instituted in 1917, "into the reasonableness and discriminating character of the interstate class and commodity rates between Memphis and points in Arkansas as well as contiguous territory in Missouri and Oklahoma," with which were consolidated a number of separate cases and certain fourth section applications. Class rates were dealt with in a previous report. The order requires a comprehensive readjustment but the general effect is to increase rates. The findings as summarized in the syllabus of the report are:

1. Rates on commodities between Memphis, Tenn., and points on class A railroads in Arkansas are unreasonable to the extent indicated in the report, and unduly prejudicial to Memphis to the extent that they exceed, by more than reasonable bridge tolls, the corresponding rates contemporaneously maintained for like distances on intrastate traffic on class A railroads in Arkansas. Reasonable bridge tolls are prescribed.
2. Rates on commodities from Memphis to points in Southern Missouri as defined in the report are unreasonable to the extent indicated in the report, and unduly prejudicial to Memphis to the extent that they exceed, by more than reasonable bridge tolls, the corresponding rates contemporaneously maintained from St. Louis, Mo., to said points for like distances.
3. Rates on commodities from Memphis to points on class A railroads in Arkansas are unduly prejudicial to Memphis as compared with the corresponding rates contemporaneously maintained from St. Louis to said points for like distances.
4. Rates on commodities from Natchez, Miss., to points on class A railroads in Arkansas, for distances not in excess of 350 miles, are unreasonable to the extent indicated in the report; and unduly prejudicial to Natchez and unduly preferential of points in Arkansas.
5. Rates on commodities from Natchez to points on class A railroads in Arkansas are unduly prejudicial to Natchez as compared with the corresponding rates contemporaneously maintained from New Orleans, La., Vicksburg, Miss., and Memphis to said destinations.
6. Rates on commodities from St. Louis, Kansas City, Mo., Memphis, New Orleans, and Cairo and Thebes, Ill., to jobbing centers in southern and western Arkansas are unduly prejudicial as compared with the corresponding rates contemporaneously maintained to Pine Bluff, Little Rock, and Fort Smith, Ark.
7. Rates on commodities from St. Louis, Kansas City, and New Orleans, to points on class A railroads in Arkansas, are unreasonable to the extent indicated in the report.
8. Rates on commodities from Monroe and Shreveport, La., to points on class A railroads in southern Arkansas are unreasonable to the extent indicated in the report; and unduly prejudicial to the extent that they exceed the corresponding intrastate rates contemporaneously maintained for like distances from competing points in Arkansas.
9. Rates on commodities from Memphis to points on class A railroads in western Louisiana are unreasonable to the extent indicated in the report; and unduly prejudicial to Memphis as compared with rates from St. Louis, Vicksburg, and New Orleans to said destinations.
10. Rates on commodities from St. Louis and Kansas City to Shreveport and Alexandria, La., are unreasonable to the extent indicated in the report.
11. The rates prescribed are approved for interstate application between points within the territory comprising Arkansas, western Louisiana, and southern Missouri.
12. The rates prescribed are approved for application at certain points in Oklahoma and Texas contiguous to Arkansas and Louisiana.
13. The rates prescribed are approved for application between St. Louis, East St. Louis, Kansas City, Cairo, Thebes, Memphis, Vicksburg, Natchez, and New Orleans, on the one hand, and points in Arkansas and western Louisiana, on the other, and between Memphis, East St. Louis, Cairo, and Thebes, on the one hand, and points in southern Missouri, on the other, wherever such rates are not specifically prescribed herein for application between said points.
14. Rates to and from defined territories are revised to correspond with changes made in basic rates to and from St. Louis and Kansas City.
15. Reasonable commodity descriptions, minimum weights, and mixed-carload rules prescribed, for application conjointly with rates prescribed.
16. Reasonable mileage allowances, and the application thereof, approved for crossing the Mississippi River at crossings south of Memphis.
17. Fourth-section relief to continue lower commodity rates via the direct lines from New Orleans, Memphis, and other Mississippi River crossings south of Memphis, and points grouped therewith and taking the same or differentially related rates, to Kansas City and other Missouri River points, and points to which rates are made with relation thereto or basing thereon, *denied*.

18. Fourth-section relief to continue lower commodity rates via direct lines from Galveston, Tex., to Missouri River cities and points basing thereon or related thereto, *denied*.
19. Fourth-section relief to continue commodity rates from Galveston and from New Orleans, Memphis, and other Mississippi River crossings south of Memphis, and points grouped therewith and taking the same or differentially related rates, to Missouri River cities and related points via circuitous routes, granted upon the conditions set forth in the report.
20. Fourth-section relief granted respondents to apply via all routes between points in the territory considered herein the lowest rate available via any route under the scales prescribed, and to maintain rates at intermediate points not exceeding the rates named in the aforesaid scales, under the conditions set forth in the report.
21. Temporary fourth-section relief granted respondents to revise rates between points in defined territories, on the one hand, and points in southern Missouri, Arkansas, and western Louisiana, on the other, to correspond with changes made in the rates between said points, on the one hand, and Kansas City and St. Louis, on the other.
22. Fourth-section relief to continue commodity rates on fruits, vegetables, canned goods, furniture, and other commodities from points of production in southern Missouri, Arkansas, and Louisiana to St. Louis, Kansas City, and Memphis which are lower than the rates contemporaneously in effect on like traffic to intermediate points, *denied*.
23. Fourth-section relief to continue rates via unduly circuitous routes between points in the territory under consideration *denied*.

Personnel of Commissions

W. A. Nabors, of Winnsboro, Tex., has been appointed a member of the Railroad Commission of Texas, succeeding Allison Mayfield, deceased, and W. W. Splawn, dean of the department of economics of the University of Texas, has been appointed in place of E. B. Mayfield, who has resigned to become United States Senator.

Court News

Last of Connecting Carriers Only Suable in Tort

The Georgia Court of Appeals holds that the last of several connecting carriers of an interstate shipment can only be sued in tort for damages thereto, and such a suit cannot be maintained where it appears that the damage occurred before the plaintiff had title to the goods.—*Davis v. Peacock* (Ga. App.), 113 S. E. 697.

Notice of Claim for Damages

Must Be Filed at Proper Place

The North Carolina statute (C. S. §3524) requires a claim for loss or damage to a shipment to be filed by the consignee with the railroad's agent at the point of destination or at the point of delivery by the railroad in possession to another common carrier. The North Carolina Supreme Court holds that a consignee who has filed his claim with the railroad's agent at point of shipment cannot maintain action. The statute must be strictly observed.—*B. F. Eagles & Co. v. East Carolina* (N. Car.), 113 S. E. 512.

Future Intermittent Damages from

Obstruction of Stream Not Recoverable

The Circuit Court of Appeals, Fourth Circuit, holds that where a railroad company, by temporary or permanent structures or fills built in a stream, obstructs the channel, and thereby diverts the regular flow of the waters therein, resulting in occasional damages to the lands of a riparian proprietor, such damages in contemplation of law are intermittent and temporary, as distinguished from permanent damages, and recovery therefor is limited to the damages as from time to time they occur.—*Chesapeake & Ohio v. Hare*, 283 Fed. 944.

Construction of Side Track—Contract

Exempting from Liability for Loss from Fire

A railroad built a side track to gasoline distributors' buildings under a contract exempting it from liability for loss or damage by fire on the gasoline company's premises arising from the operation of the track for the benefit of the gasoline company. The Michigan Supreme Court holds that this contract did not relieve the railroad from liability for damage from fire when a train on its main track ran through an open switch into tank cars containing gasoline on the side track, due to the engineer's negligence in disregarding a signal.—*Standard Oil Co. v. Payne* (Mich.), 190 N. W. 769.

Foreign Railway News

Finland to Build Own Railway Equipment

The Finnish State Railways will build 200 open goods wagons and 50 passenger coaches in their own shops, according to advice from Helsingfors to the Times (London) Trade Supplement. In addition 18 locomotives are to be acquired, but whether these will be built in the company's shops or purchased from builders in other countries has not yet been decided.

A "Virtuous Circle"

Further reductions in rates on British railways are said to be in prospect, based upon the favorable returns which the companies earned in 1922 due to the falling costs of labor and materials and the increase in traffic. Modern Transport (London), in speaking of the proposed rate reductions, says that the "vicious circle" has been reversed and that the process of industry seems now to be traversing a "virtuous circle."

Scottish Locomotives for India

According to the Times (London) Trade Supplement, the firm of William Beardmore & Sons, Dalmuir, Scotland, has received orders for 17 heavy Pacific type locomotives for the Indian State Railways. The North British Locomotive Company also claims to have obtained "a large number" of contracts for their Glasgow works. The Scottish locomotive builders seem optimistic and are said to expect to receive further extensive orders in the near future.

Russians May Control Chinese Eastern

According to press dispatches to the New York Times from Moscow, the Russian Soviet government, the Chinese government and Baron Putiloff (representing private stockholders in the Chinese Eastern) have entered into an agreement whereby the line will be managed by a mixed company with majority control in the hands of the Russian State Bank and the Moscow Industrial Bank (Soviet enterprises). In the original company, the Russian government and the Russo-Asiatic Bank held the majority of the stock and the Chinese government held the minority. This bank is controlled by French investors and the new arrangement will probably mean the resumption of interest payments of which none have been made in several years.

Italy Plans to Lease Railways to Private Concerns

The Italian government is planning the details of the contracts under which the railways are to be turned over to private concerns, according to Rome dispatches to the New York Times.

The fundamental principles are that private enterprise will take the roads on leases lasting for a number of years, agreeing by contract with the government how much capital must be set aside as a guarantee of the solvency of the companies, or buying reserve material and for general expenses. Private enterprise is to get 7 per cent interest on this capital and to divide everything over 7 per cent with the government in a ratio to be decided upon.

The roads will pass to private enterprise completely. Private companies will not merely administer them for the government, but must assume full responsibility. This leads to the necessity that the roads be ceded for long terms of years, so that private enterprise may have a sufficient period to run them under normal conditions after the inevitable period of transformation and settling down. It will be possible for private enterprise to denounce the contracts if the economic conditions on which they are based prove to be fallacious.

The government will hand over the railroads in their present state. Private enterprise will have to see to upkeep and

rolling stock and to return the roads at the end of the contract period in the same condition. There will be full liberty to run the railroads in whatever way private enterprise thinks best, and it will have the right to decide on the number of the personnel to be employed. The government, therefore, breaks its present contract with its employees, but private enterprise must choose nine-tenths of the employees from the present railroad staffs.

There will be full liberty in regard to wages to the employees, provided there is a guarantee of wages for five years and of stable employment to all specialized workmen. The approval of the government must be obtained for proposals as to the juridical status of the employees.

China Notes

February 1 saw the final transfer of the control of the Shantung Railway from the Japanese to the Chinese personnel. About a score of the former Japanese employees who have either special skill in some process or a special knowledge of the files and history of certain pieces of property have been retained by the Chinese administration. The change has occurred without incident.

After about six weeks with no responsible head the Ministry of Communications has been reorganized. The new minister, Wu Yu-lin, is a Tsao Kun appointee. He is a man of the older school, but is a graduate of the naval college at Greenwich, England. He holds the rank of admiral in the Chinese navy, but for several years has devoted himself to industrial pursuits, latterly being manager of the Peiyang Iron Works. Under the preceding administration he was managing director of the Tientsin-Pukow Railway.

C. T. Sun, the vice-minister, is a graduate of Cornell in engineering, and has held the position of managing director on the Shanghai-Nanking line and on the Siemens-Carey projects. During the past two years he has been engaged in banking and warehousing. K. Y. Pao, director of the railway department, for the past eight years has been chief auditor of the Tientsin-Pukow line. He is an English returned-student. Thus for the first time all three of the highest officers of the Chinese railway system are Western trained students. During past administrations some one of these three has occasionally been a foreign trained man. The last administration was the first in which these officers were all able to speak English. These facts are merely evidences of the general tendency toward the use of modern methods which, in spite of reactionary events, is shaping the course of Chinese affairs.

On February 7 through passenger service between Peking and Hankow was resumed after a short but violent strike. The successful termination of the strikes last summer had served to strengthen the hands of the organizers of the infant unions. A headquarters for the central district was opened at Chengchow, Honan. This place is the headquarters also of Gen. Wu Peifu, who since his defeat in Peking politics, evidently feared for his control over the Peking-Hankow Railway. He sent a force of men to close the headquarters with the result that a small riot was precipitated. Within three days the line was absolutely closed down and sympathetic strikes were attempted on other lines. The Tientsin-Pukow ferry service and the Canton-Hankow line were also tied up for a few hours. Whatever their political differences, the military leaders all along the Peking-Hankow line acted with remarkable unison. A military force from Peking dropped down upon the general shops at Chansintien and forced the shopmen to begin work after a small disturbance in which one striker was killed. At Hankow several of the labor leaders were arrested and tied up in public. When the workmen made a rush to release them, a volley was fired resulting in the death of 32 workmen and the injury of perhaps 50 more. The local organizer was beheaded and his head placed on a pole at the station. The workmen know that the militarists are appropriating the revenues of this line, and that as a result the continued working of the line after a year or two is somewhat in jeopardy. Hence the bad feeling is likely to continue. Students are declaring sympathy with the railway workers, and the alliance between the scholar class and the workers which was hinted at in previous issues of these notes is becoming more in evidence. The discovery among the papers of a prominent professor, whose house was raided recently, of a record of large bank deposits in his name from sources very conclusively Bolsheviki gives further light upon the forces which are moving present day China.

The following pieces of new railway construction have lately become sufficiently complete to allow the transport of passengers and goods either by regular traffic trains or by construction trains:

1. Extension of Szepinghai-Chenchiatun line as far as Paiyintali—about 70 miles. This line is operated as a branch of the South Manchurian, although it is rated as a Chinese government railway.

2. A section of the Chaoyang branch of the Peking-Mukden line has been opened for about 30 miles.

3. The Lung-Hai line is now operating the first section of the line east of the Tientsin-Pukow Railway. This section extends to the Grand Canal. Construction of the remainder to the coast and of the bridge over the Grand Canal is under way.

4. Extension of the Peking-Suiyuan line to Paotou, at the northern bend of the Yellow river. This extension of a little over 100 miles has been put through during the course of a year. Paotou is of strategic importance in that the Yellow river carries products originating almost as far south as the borders of Thibet while the camel routes from Sinkiang across the Gobi desert converge there. The year 1923 should see the beginning of a much larger tonnage carried by the Peking-Suiyuan.

The Future of India's Railways

The Legislative Assembly of India is discussing the question of state versus company management for the country's railways, according to the Times (London) Trade Supplement.

A decision of future policy cannot be long deferred, for the contracts of the two senior and highly important systems which serve the heart of India between Calcutta and Bombay, the East Indian and the Great Indian Peninsula Railways, expire in 1925, the former having been provisionally extended in 1920 for five years. To assist the government in reaching a conclusion the Indian Railway Committee was set up under the chairmanship of Sir William Acworth. The report issued in the autumn of 1921 showed a sharp division of opinion. Half the committee favored state management. The other half, including three men with long experience of Indian railways and the most distinguished Bengali in the business world to-day, recommended that company management should be continued, but with Indian instead of London domicile.

One of the arguments of Sir William Acworth, and the four members of the committee agreeing with him, was that however good company management may be *per se* it does not really exist in India, where the state holds 80 or 90 per cent of the company capital. The companies, they argued, are hopelessly entangled in a web of government regulations and restrictions, while the government, having cut itself off from management, is without initiative. Sir Robert Gillan, in association with the other half of the committee, fails to recognize this picture of unworkableness. He claimed that there is in fact a substantial element of private enterprise making for efficiency. It is obvious that so long as government has the overwhelming financial interest in the railways it must be allowed to control the financial policy.

To remove the financial difficulties which have been felt in the past, Sir William Acworth proposed the separation of the railways from the general budget of the government, as a condition precedent to the adoption of state management. The condition has already been considered by a committee of the Legislature and rejected with the approval of government, so that the Acworth scheme is left in the air. One of the main grounds for the proposal was that of the uncertainty of the steady continuance of projects of renewal and extension when the capital allotment for railways is contingent on the financial exigencies of the hour; and, further, the irritating and hampering effect of the lapse of such portions of grants as may be unexpended at the end of the financial year. These difficulties have been met, apart from the question of future management, by the definite allocation of £100,000,000 spread over five years for railway renewals and improvements. It follows that some of the main grounds for recommending general state management have been swept away.

It is certain that if company management is retained Indian

opinion will press strongly for Indian domicile for the companies. The money for Indian railways has been raised almost entirely in the London market, and could not have been obtained in India under the old conditions.

It was not merely right and proper, as Sir Robert Gillan said, but essential to raising capital, for the companies to be domiciled in London. The last twenty years have seen remarkable advance in the power of the Indian money market to raise large capital on reasonable terms. Sir Robert holds that in these altered circumstances it would be more natural now to have Indian companies. He kept in mind Sir William Acworth's view that if the large systems were handed over to the management of Indian domiciled companies, the effect would be practically to close the London market against them. His own view is that much will depend, in this matter, on the personnel of those who promote the company, and the circumstances at the time of its promotion. He suggested that it did not necessarily follow from Indian domicile that all the directors would have to be resident in India. The governing consideration would be how to get together a board that would command the greatest amount of confidence of investors both in England and in India.

There are many competent observers who share the conviction of Sir Robert Gillan that universal state management, which has had unfortunate results wherever it has been tried, would prove the ruin of Indian railways. But political considerations stand in the way of due recognition that the railways are a commercial proposition, and that their management must be considered from the economic and business point of view.

Standard Colors for Rolling Stock

on the London & North Eastern

Marylebone Station, the London terminus of the Great Central section of the London & North Eastern Railway, was, on February 22, the scene of an interesting assemblage of locomotives and passenger coaches, according to Modern Transport (London). The occasion was an inspection by the directors of the company with a view to considering the recommendations of the chief mechanical engineers of the constituent companies as to the standard style and color for locomotives and the exteriors of passenger cars. For the passenger locomotives the color recommended was the Great Northern Railway Company's standard green, as represented at the inspection by one of that company's new "Pacific" type engines. There were three Great Central passenger locomotives, two painted the G. C. standard green and the other the suggested green; also two of the North Eastern and two of the North British, one in each case being painted the owning company's standard green and the other the suggested green. In addition, there was a Great Eastern locomotive painted the suggested green. These arrangements enabled the directors to judge of the appearance of the most interesting locomotives of the group when in their original colors as compared with the suggested standard color. There was little doubt as to their opinion being in favor of the color and general arrangement of the decoration of the Great Northern locomotive, which will be the standard for all London & North Eastern passenger locomotives of the future.

As regards freight locomotives, black, as used in standard practice for freight engines on the North Eastern Railway, has been decided upon as the standard color. Three engines were drawn up for inspection, one North Eastern and two Great Central. Of the latter, one was painted black to the North Eastern standard and the other similarly treated, but lined up to show its appearance if used for passenger work. Varnished teak has been decided upon for the exteriors of the passenger cars. Four coaches were inspected, a Great Central in imitation teak, two Great Northern in varnished teak, and an East Coast joint carriage in imitation teak. An explanatory notice was affixed to each car and locomotive. In this way it was easy for the directors to form an accurate idea as to the merits of the respective colorings. It is understood that the locomotives and rolling stock will only be repainted in accordance with the standards decided upon, when they go into the shops for general overhauling and no unnecessary work of this description will, therefore, be undertaken.

Equipment and Supplies

Locomotives

THE PACIFIC ELECTRIC is inquiring for 10 electric locomotives.

THE CAROLINA, CLINCHFIELD & OHIO is inquiring for 10 Mallet type and 10 Mikado type locomotives.

THE MIDLAND VALLEY has ordered 3 Mikado type locomotives from the Baldwin Locomotive Works.

THE ELGIN, JOLIET & EASTERN has ordered 5 Mikado type locomotives from the Lima Locomotive Works.

THE MISSISSIPPI CENTRAL has ordered two Mikado type locomotives from the American Locomotive Company.

THE FORD MOTOR COMPANY has ordered four 0-8-0 switching locomotives from the Lima Locomotive Works.

THE TOLEDO TERMINAL has ordered two Consolidation type locomotives from the American Locomotive Company.

THE NEW YORK, NEW HAVEN & HARTFORD has ordered 10 Mountain type and 5, 0-8-0 switching locomotives from the American Locomotive Company.

THE SEABOARD AIR LINE, reported in the *Railway Age* of February 17 as inquiring for from 25 to 35 Mikado type locomotives, has ordered 20 Mikado type locomotives from the American Locomotive Company.

THE AKRON, CANTON & YOUNGSTOWN, reported in the *Railway Age* of February 3 as inquiring for from 3 to 5 Consolidation type locomotives, has ordered 3 Consolidation type locomotives from the Baldwin Locomotive Works.

THE BALTIMORE & OHIO, reported in the *Railway Age* of March 10 as having reserved space for a number of locomotives, has ordered 25, 2-10-2 type locomotives from the Lima Locomotive Works and 50, 2-10-2 type locomotives from the Baldwin Locomotive Works.

Freight Cars

THE BINGHAM & GARFIELD is inquiring for 5 caboose cars.

THE SOUTHERN PACIFIC is inquiring for 300, 50-ton work cars.

THE BERTHA COAL COMPANY is inquiring for 100 hopper cars.

THE CANADIAN PACIFIC is inquiring for 300 automobile cars.

THE CHICAGO & ALTON is inquiring for repairs to 200 gondola cars.

THE MATHIESON ALKALI WORKS, New York, is inquiring for 40 tank cars.

THE MERCHANTS DISPATCH will build 1,500 refrigerator cars in its own shops.

THE SEABOARD AIR LINE is asking for prices on the repairs of 1,000 box cars.

THE ILLINOIS CENTRAL is contemplating coming into the market for repairs to several thousand freight cars.

THE PHILADELPHIA ELECTRIC COMPANY has ordered 7 hopper cars of 55 tons' capacity from the Pressed Steel Car Company.

THE STONE & WEBSTER ENGINEERING CORP., Boston, Mass., has ordered 2 hopper cars of 55 tons' capacity from the Pressed Steel Car Company.

THE WHITE EAGLE OIL & REFINING CO., Wichita, Kan., has ordered 100 8,000-gal. capacity tank cars from the Pennsylvania Tank Car Company.

THE SOUTHERN RAILWAY, reported in the *Railway Age* of March

10 as having ordered 6,135 cars, has also ordered 2,000 coal cars from its Lenoir Car Works.

THE CHESAPEAKE & OHIO has ordered 1,000 hopper cars of 70 tons' capacity from the American Car & Foundry Co., and 1,000 from the Standard Steel Car Company.

THE CAMBRIA & INDIANA, reported in the *Railway Age* of March 10 as contemplating coming in the market for a number of coal cars, has ordered 1,000, 55-ton hopper cars from the Cambria Steel Company.

THE SEABOARD AIR LINE, reported in the *Railway Age* of March 3 as inquiring for 2,000 cars, has ordered 1,000 box cars from the Pressed Steel Car Company, 800 gondola cars from the Standard Steel Car Company and 200 gondola cars from the Newport News Shipbuilding Corporation.

THE TEXAS COMPANY, reported in the *Railway Age* of February 17 as inquiring for 300 tank cars, has ordered 200 tank cars of 8,000 gal. capacity from the Pennsylvania Tank Car Company, 50 tank cars of 8,000 gal. capacity from the Chicago Steel Company and 50 tank cars of 10,000 gal. capacity from the Standard Tank Car Company.

THE LOUISVILLE & NASHVILLE, reported in the *Railway Age* of March 10 as inquiring for 8,000 cars, has ordered 6,000 hopper cars of 55 tons' capacity from the Pressed Steel Car Company, 1,000 ventilated box cars of 40 tons' capacity from the Mt. Vernon Car Manufacturing Company and 1,000 ventilated box cars of 40 tons' capacity from the Chickasaw Shipbuilding Company.

BOSTON & MAINE.—The annual report of this road issued on March 20 contains the following: "While neither financial nor price conditions favor the acquisition of equipment at this time, it has been deemed essential to purchase 10 additional Santa Fe freight engines, 10 Pacific passenger engines, 200 refrigerator cars, 300 flat cars and 100 ballast cars, which are also adapted for tidewater coal service. Although not as yet authorized by the board of directors, the program also contemplates the acquisition of 1,500 box cars and 1,000 coal cars as soon as financial and market conditions permit." The locomotives mentioned were ordered from the American Locomotive Company as was reported in the *Railway Age* of March 3. No orders have yet been placed for the cars.

Iron and Steel

THE BALTIMORE & OHIO is inquiring for from 800 to 900 tons of steel for bridges.

THE DELAWARE, LACKAWANNA & WESTERN is inquiring for 1,200 tons of steel for bridges.

THE UNION PACIFIC has ordered 1,225 tons of structural steel from the McClintic-Marshall Company.

Machinery and Tools

THE UNION PACIFIC has placed an order for a 200-ton locomotive lifting crane.

Miscellaneous

THE IMPERIAL JAPANESE GOVERNMENT RAILWAYS are asking for bids through New York City export houses for parts for 30 locomotives to be built in the shops at Osaka, Japan.

THE NEW YORK CENTRAL will receive bids until 12 o'clock noon April 2 for sheets, steel tubes, axles, nails and staples, steel bars, shapes and plates, steel billets, locomotive tires and cast iron wheels.

Signaling

THE CHICAGO & EASTERN ILLINOIS has instructed the Miller Train Control Corporation to proceed with the installation of its device on all new locomotives which are being received for service on its Chicago division. Six Pacific type and ten Mikado type locomotives are to be equipped.

Supply Trade News

The General Electric Company's storehouse at Rio de Janeiro, Brazil, was destroyed by fire on March 19.

A. C. Goodale has been appointed branch manager of the Cutler-Hammer Manufacturing Company, with headquarters at Detroit, Mich.

Clifford F. Messinger for the past three years general sales manager of the Chain Belt Company, Milwaukee, Wis., has been elected second vice-president.

The Reliance Manufacturing Company, Massillon, Ohio, has opened a district sales office in the Fullerton building, St. Louis, Mo., in charge of A. C. Rule.

C. A. Dunn, formerly sales representative of The Prime Manufacturing Company, has been appointed manager of sales of The Weldless Tube Company, Wooster, Ohio.

Dr. Cary T. Hutchinson, consulting engineer, is now associated with Sanderson & Porter, New York, and will direct the department of railroad electrification of that firm.

The Gibb Instrument Company, Bay City, Mich., manufacturers of electric welding equipment, has opened a sales office in Cleveland, Ohio, at 2104 East Superior avenue, in charge of W. O. Little.

The Walter A. Zelnicker Supply Company, St. Louis, Mo., has removed from 325 Locust street, where the company was located for the last 20 years, to new offices in the Chamber of Commerce building, 511 Locust street.

The Production Engineering Corporation, Canastota, N. Y., has been incorporated to take over the business of the Marvin & Casler Company, Canastota. This corporation will continue to manufacture and sell the Casler tools for machine shops.

The Hall Brothers Cedar Company has removed its general office from Jacksonville, Texas, to Coeur d'Alene, Idaho. In its new location the company will engage in the manufacture and wholesaling of western red cedar posts, poles and piling.

The Union Asbestos & Rubber Company has moved its factory to 351 East Ohio street, Chicago. The general office of the company will be located at the factory and the present offices at 231 South Wells street will be retained as the sales offices of the organization.

Lawrence F. Whitney has joined the New England sales organization of the Reading Iron Company, Reading, Pa. Mr. Whitney will assist the district sales manager for New England. He will be located in the company's district office at 161 Devonshire street, Boston, Mass.

Robert R. Wells has become associated with the Hunt-Spiller Manufacturing Corporation, Boston, Mass., as one of its representatives in the Western territory. Previous to March 1 Mr. Wells had for some years been connected with the United States Metallic Packing Company.

The Truscon Steel Company, Youngstown, Ohio, has purchased the National Steel Joist division of the Central Steel Company, Massillon, Ohio, and will continue the operation of the plant at Massillon until a new building at Youngstown is completed, at which time the equipment will be transferred and the operation at Massillon discontinued.

E. M. Speakman formerly machine shop foreman of the Virginian Railway and B. O. Yearwood, formerly chief inspector of the U. S. Railroad Administration at the Richmond Works of the American Locomotive Company are now in the service of the Franklin Railway Supply Company, Inc., New York, as inspectors at builders' plants and A. M. Meston has been appointed service engineer on the Pacific Coast. Mr.

Meston resigned recently as district road foreman of engines of the Southern Pacific.

J. Rowland Bibbins, whose resignation as manager of the Department of Transportation of the Chamber of Commerce of the United States was announced in the *Railway Age* of February 17, page 441, has entered into a private practice as a consulting engineer in transportation development. Mr. Bibbins was formerly supervising engineer for the Arnold Company, Chicago. His office will be at 921 Fifteenth street, Washington, D. C.

C. R. Lewis, general manager of sales of the Standard Forgings Company, Chicago, has been appointed vice-president. Mr. Lewis was with the freight traffic department of the New York Central for 21 years before associating himself with the Standard Forgings Company in February, 1917. Laurence C. Ryan, who has been with the company for 17 years and treasurer for a number of years, has been appointed vice-president in addition to retaining his office as treasurer.

Edward C. Waldvogel, general manager of the Yale & Towne Manufacturing Company, Stamford, Conn., has been elected a vice-president. His title in the future will be vice-president in charge of sales superseding the former title of general manager. He entered the service of the Yale & Towne Manufacturing Company as a traveling salesman in 1905. In 1910 he was transferred to New York as assistant to the general manager. In 1912 he was appointed assistant general manager and since 1916 served as general manager.

The Sprague Electric Works of the General Electric Company will consolidate its district and local offices with corresponding offices of the General Electric Company, effective April 1. The manufacture and exploitation of Sprague products will be continued in the name of the General Electric Company in the recently organized merchandise department. The Sprague conduit products section and the Sprague apparatus section of the merchandise department will, for the present, continue offices at 527 West Thirty-fourth street, New York City.

Harold Rosendahl of the sales department of the Mahr Manufacturing Company, Minneapolis, Minn., has been promoted to district manager with headquarters at Pittsburgh, Pa. J. O. Connelly has been appointed eastern representative with headquarters at New York succeeding W. H. White resigned and will be assisted by R. G. White. E. F. Piea has been placed in charge of the Philadelphia office. Jacob Ebert has been placed in charge of the Baltimore office. J. L. Scanlon has been placed in charge of the Buffalo office. A. D. Fishel has been placed in charge of the Cleveland office.

Hunter Michaels, advertising manager of the Union Metal Products Company, with headquarters at Chicago, whose appointment as sales agent of the Railway Steel Spring Company, with the same headquarters, was announced in the *Railway Age* of March 17, was born on September 26, 1889, at Chicago. In 1903 he entered the employ of the National Dump Car Company as sales engineer, with headquarters at Chicago, and remained in this position until 1911, when he was appointed sales engineer of the Spencer Otis Company, with the same headquarters. He was appointed mechanical engineer of the Union Metal Products Company, with headquarters at Chicago, in 1913, and in 1919 was promoted to advertising manager and assistant office manager, with the same headquarters, which position he held until the time of his recent appointment. During the war he served as first lieutenant with the 114th Engineers, U. S. Army.

American Brake Shoe and Foundry Company

The report of the American Brake Shoe and Foundry Company for the year ended December 31, 1922, shows net profits after charges, depreciation and federal taxes of \$2,120,539, equivalent after dividends on the subsidiary stock and the preferred shares to \$9.60 a share on the 151,238 shares of no par common stock outstanding, compared with \$1,320,271, or \$4.41 a share the previous year. The surplus after dividends was \$832,103, against \$46,736 the previous year.

The balance sheet as compared with the previous year shows an increase of \$2,028,397 in net current assets and a decrease in plant account of \$1,124,224, the latter having been due principally to the sale of the Newark plant. There has been transferred from surplus to capital account during the year the sum of \$7,442,700, thereby increasing the nominal value of the no-par common stock from \$5 to \$50 per share.

In his remarks to the stockholders President Joseph B. Terbell said:

"In order to serve an additional number of customers by direct delivery to their lines of road and save freight charges, it was deemed to the best interests of the company to establish additional brake shoe plants. In line with this policy, two new plants have been authorized by your board of directors, one to be located at Houston, Texas, and the other at Portsmouth, Va. We expect these plants will be completed and in operation some time before July 1, 1923.

"The year 1922 showed continued improvement throughout the year, and in the latter part your plants were being operated at capacity. This condition still continues and, unless there is an unexpected change in general business conditions, the profits for the current year should equal those of last year."

The Western Electric Company

The annual report of the Western Electric Company for the year ended December 31, 1922, shows a net income of \$5,331,793, equivalent to \$9.28 a share earned on the 500,000 shares of no par stock outstanding, compared with \$4,323,997, or \$12.35 a share on 350,000 shares of outstanding stock in 1921. Sales for the year amounted to \$210,941,004, compared with \$189,764,814 for the previous year. The report shows a surplus of \$1,144,936 after all charges and dividends, compared with \$823,997 for 1921. The balance sheet shows current assets of \$101,702,583, of which \$11,008,869 is represented by cash on hand and in banks and current liabilities of \$31,233,267. The total reserve at the close of 1921 was \$37,349,378.

The income account for 1922 and the balance sheet as of December 31, 1922, are as follows:

INCOME ACCOUNT			
	1922	1921	
Gross sales	\$210,941,004	\$189,764,814	
Manufacturing costs, federal taxes, etc.	203,995,950	182,490,976	
Special appropriations	400,000		
Net earnings	\$6,545,054	\$7,273,838	
Other income	\$2,690,836	\$2,892,499	
Total income	9,235,890	10,166,337	
Interest	3,904,097	5,842,340	
Net income	\$5,331,793	\$4,323,997	
Dividends	3,186,857	3,500,000	
Surplus for year	\$1,144,936	\$823,997	
Earned on common	9.28	12.35	
BALANCE SHEET			
	1922	1921	
Assets:			
Real estate, plant, equipment, etc.	\$49,205,525	\$45,565,836	
Merchandise	52,701,893	58,897,025	
Cash	11,008,869	13,262,880	
Securities	166,040	833,268	
Bills receivable	1,200,838	779,019	
Emp. bd. pur.	205,802	465,464	
Accounts receivable	36,419,141	39,609,401	
I. W. E. Co., Delaware	15,135,561	17,988,053	
Sundry investments	2,150,392	2,315,471	
Totals	\$168,194,061	\$179,801,417	
Liabilities:			
Preferred stock	\$24,679,600	\$58,773,450	
Common stock	74,931,826	43,600,000	
Bonded debt		43,084,549	
Current liabilities	31,233,257	27,924,413	
Reserve for depreciation	30,431,368	1,600,000	
Employees' benefit fund	2,000,000	4,819,005	
Reserve for contingencies	4,918,010		
Totals	\$168,194,061	\$179,801,417	

*550,000 Shares no par. †Called for payment at 120, March 5, 1920.

Bucyrus Company

The annual report of the Bucyrus Company for the year ended December 31, 1922, shows earnings aggregating \$746,301, compared with \$445,905 for 1921. The balance after dividends was \$326,301, which was an increase of \$110,306 over the previous year. The regular dividend on the preferred stock at the rate of 1 1/4 per cent quarterly was paid throughout the year and in November, 1922, an extra dividend of 3 1/2 per cent, payable on January 2, 1923, was declared. The dividend appears as a current liability

on the attached balance sheet. Cumulative dividends aggregated 17 1/2 per cent at the end of the year.

INCOME ACCOUNT			
	1922	1921	
Net earnings	*\$746,301	\$445,905	
Dividends	420,000	300,000	
Balance	326,301	115,905	
Previous surplus	3,259,511	3,113,606	
Total surplus	3,585,813	3,259,511	
ASSETS			
Cash	\$435,535	\$268,139	
Securities	143,610	714,524	
Accounts and Bills Receivable	1,903,534	1,159,450	
Inventories	2,568,005	2,658,152	
Property account	7,490,971	7,187,303	
Total	\$12,541,657	\$11,987,571	
LIABILITIES			
Accounts payable	\$406,875	\$142,954	
Advance payments received	64,662	162,978	
Preferred dividend payable	210,000	70,000	
Accrued taxes and reserves	274,306	352,126	
Preferred stock	4,000,000	4,000,000	
Common stock	4,000,000	4,000,000	
Surplus	3,585,813	3,259,511	
Total	\$12,541,657	\$11,987,571	

* After deducting costs of manufacturing, repairs and maintenance, administration and selling, royalties, depreciation, interest, insurance and taxes.

Obituary

James V. Davison, vice-president of the National Malleable Castings Company, with headquarters at Cleveland, Ohio, died on March 14 in that city.

F. L. Craycraft, vice-president, American Steel Company of Cuba, died in Havana on March 15, and was buried from his former home in Asheville, N. C., on March 20.

Charles M. MacNeill, president of the Utah Copper Company and the Chino Copper Company, vice-president and a director of the Replogle Steel Company and a director of the Vanadium Corporation of America, died on March 17 of pneumonia at his home in New York City at the age of 52.

Trade Publications

INCREASING TRACK CAPACITY.—This is the title of the fourth bulletin on train operating economies in the series issued by Henry M. Sperry, 347 Madison avenue, New York City. The present bulletin—an illustrated booklet of 26 pages—is devoted to an account of the changes in methods of operation effected in 1919 by the Western Maryland on its line between Cumberland and Hagerstown, 79 miles. By a change to "turn-around service," the full use of automatic block signals on single track, and the delivery of train orders without stopping the trains, a saving was accomplished estimated, on the basis of the results secured in 1919 as compared with 1918, to be over \$175,000 annually. In 1920, as compared with 1918—both years of heavy traffic—the results showed an increase of 48 per cent in the number of tonnage trains, this additional business being handled with a decrease of 3 hrs. 47 min., or 29 per cent, in average crew time per trip, and with a decrease of 69 per cent in overtime hours per year. The bulletin is of unusual interest because of its excellent illustrations, charts and tables and careful editing. Photographs are given of the tonnage trains and the charts show a comparison of the business handled, the average crew time, etc. A diagram of special interest is that on page 12 showing in colors a typical arrangement of automatic block signals for the protection of following and opposing trains on single track. The indications are given to cover two opposing trains in seven different positions. In describing the turn-around service, itself, it has been Mr. Sperry's purpose to show how the efficient operation of this service was made possible through the use of signals on the one hand, and to show how the service brought about, on the other hand, a more complete utilization of the economies made possible by the signals. The discussion of these factors is supplemented by details relative to Western Maryland methods of dispatching with reference particularly to train operation by signal indication. An appendix gives information concerning the characteristics of the Western Maryland as a whole and there is included also a section dealing with the general subject of the Increase in Operating Efficiency by More Extensive Use of Signals.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company will construct a second main track from Bakersfield, Cal., to Kern Jct.; a water treating plant at Hot Springs Jct., Ariz., and a third main track from Emporia, Kan., to Plymouth.

BALTIMORE & OHIO.—This company has placed a contract with the Pittsburgh Construction Company covering the erection of three deck plate girder spans at Proctor, W. Va. The new spans vary in length from 40 to 103 feet, and the total weight of steel involved is approximately 160 tons.

CENTRAL OF GEORGIA.—This company has awarded a contract to the Ogle Construction Company, Chicago, for the erection of a reinforced concrete electrically-operated coaling station which will provide for ground and overhead storage of 9,000 tons and 600 tons of coal, respectively, and the storage of 200 tons of wet sand and 35 tons of dry sand, at Macon, Ga.

CHICAGO, BURLINGTON & QUINCY.—This company plans the construction of a new cut-off 16 miles long from Frederick, Ill., to Vermont, and is contemplating the construction of new passenger stations at Lathrop, Mo., and Carthage.

CHICAGO & NORTH WESTERN.—This company contemplates the construction of a roundhouse and machine shop at Watersmeet, Mich., to cost approximately \$35,000.

CHICAGO & NORTH WESTERN.—This company has been ordered by the Railroad Commission of Wisconsin to construct, jointly with the Chicago, Burlington & Quincy, the Chicago, Milwaukee & St. Paul and the La Crosse & Southeastern, a union passenger station at La Crosse, Wis.

CHICAGO & NORTH WESTERN.—This company contemplates the construction of a new bridge approximately 1,000 ft. long across the Missouri river at Blair, Neb.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has awarded a contract to the Railroad Water & Coal Handling Company, Chicago, for the construction of oil stations, to cost \$15,000 each, at El Dorado, Ark., Haskell, Tinsman and Malvern.

EL PASO & SOUTHWESTERN.—This company plans the construction of a 10-stall addition to its roundhouse and the enlargement of its coach shops at El Paso, Tex.

GREAT NORTHERN.—This company contemplates the construction of a reinforced concrete and steel ore dock at Superior, Wis., to cost approximately \$1,500,000, which will replace one of the present docks of timber construction.

ILLINOIS CENTRAL.—This company has awarded a contract to the Smith & Mitchell Construction Company, Kansas City, Mo., for the reduction of grade at Paxton, Ill., as reported in the *Railway Age* of January 20. The company has also awarded contracts to the Walsh Construction Company, Chicago, for the grade reduction at Magnet, Ill., and to M. L. Windon, Centralia, Ill., for the grade reduction at Alma, Ill., also reported in the *Railway Age* of January 20. A contract has been awarded both to W. H. Spradlin, Fulton, Ky., for alterations to the passenger station at Morganfield, Ky., as reported in the *Railway Age* of February 17 and to A. Ward, Chicago, for the grading in preparation for the construction of fifth and sixth main tracks at Matteson, Ill. Thirty-foot extensions will be constructed to the frame passenger stations at Hazelhurst, Miss., and Sturgis, Ky.

ILLINOIS CENTRAL.—Work is to be resumed on the construction of the Markham classification yard at Chicago, which has been suspended since 1918. This work will require the expenditure of \$6,000,000, in addition to the \$2,000,000 already spent. It will include the separation of grades with the Baltimore & Ohio and the Grand Trunk; the construction of a new passenger station and subway at Harvey, and a subway at Homewood.

ILLINOIS CENTRAL.—This company will construct two brick bunkhouses at Dunlap, Ia. Bids were closed on March 20 for the

construction of a freight and passenger station at Beaver Dam, Ky.

JEFFERSON SOUTHWESTERN.—The Interstate Commerce Commission has denied this company's application for a certificate authorizing the construction of a line of 14½ miles from Mt. Vernon, Ill., to a connection with the Chicago, Burlington & Quincy, about 3 miles south of Waltonville, Ill. The Burlington and the Wabash, Chester & Western opposed the granting of the certificate, while the Illinois Commerce Commission recommended it. The commission says it is unable to find that the present or future public convenience and necessity require construction of this line.

LONG ISLAND.—This company has commenced work on its grade crossing elimination project between Jamaica, L. I., and Floral Park. The work will include the elimination of eight grade crossings and the addition of two running tracks making a four-track line. The state and local governments will share the cost of the elimination work with the railroad. It is expected that the work will be completed by the summer of 1924 and that the cost will approximate \$2,500,000. The company has also undertaken grade crossing elimination work at Richmond Hill on its Montauk division to cost approximately \$750,000.

LONG VIEW, PORTLAND & NORTHERN.—This company has withdrawn the plans for the construction of an 8½ mile single track line at Kelso, Wash., which were reported in the *Railway Age* of December 16, and is revising them in preparation for the construction of 26 miles of double track line.

MISSOURI, KANSAS & TEXAS.—This company will construct an addition to its freight station at Kansas City, Mo., to cost approximately \$200,000. Work on the structure is expected to start in 90 days.

MISSOURI PACIFIC.—This company has awarded a contract to Folwell-Ahlskog Company, Chicago, for the construction of a 2,000,000-bu. capacity, reinforced concrete grain elevator at St. Louis, Mo., as reported in the *Railway Age* of March 10.

MISSOURI PACIFIC.—This company contemplates the construction of a supply building at Chouteau avenue, St. Louis, Mo., to cost approximately \$100,000. The company will soon call for bids for the construction of six water treating plants along its line between El Dorado, Ark., and Gurdon. The cost of this construction is expected to be approximately \$50,000.

NORTHERN ALBERTA.—The way is clear now for the extension of Northern Alberta railways, it is reported in dispatches from Edmonton. An agreement has been fully and finally reached between the provincial government and the McArthur and Union Bank interests, and the documents in the case are now being drawn up. It is possible the railway department of the Alberta government will do the construction work rather than the Canadian Pacific Railway.

PENNSYLVANIA.—This company will shortly begin the construction of a 3,000,000-gal. reservoir in the Enola yards, on its low grade freight line, just west of Harrisburg, Pa. This increase in the water supply is a part of a general plan to improve the facilities at Enola, in order to handle more expeditiously the movement of preference and arranged scheduled freight trains through the yards. The new reservoir will be constructed of clay and earth, deposited in thin layers, and welded into a compact embankment. The bottom and inner slopes of the embankment will be covered with a protecting layer of concrete. The water supply is to be pumped from the Susquehanna River, and will flow from the reservoir by gravity throughout the shops and yards.

RALEIGH & POCAHONTAS.—The Interstate Commerce Commission has denied this company's application for authority to construct a line of 6,608 feet from Blue Jay, W. Va., to a connection with the Raleigh & Southwestern and to operate over that line under trackage rights to Blue Jay Junction, 1.1 miles.

SOUTHERN PACIFIC.—This company contemplates the construction of a new freight and passenger station at Reedsport, Ore.

TEXAS & PACIFIC.—This company will construct new shop buildings and terminal facilities at Alexandria, La., to cost approximately \$1,000,000.

TOLEDO TERMINAL RAILWAY COMPANY.—This company has awarded a contract to the Ogle Construction Co. for the erection of a 200-ton, two-track, reinforced concrete coaling and sanding station at Toledo, Ohio.

Railway Financial News

BOSTON & MAINE.—Annual Report.—The annual report issued on Tuesday shows for 1922 a net after fixed charges of \$126,422, this figure being an increase over 1921 of \$7,474,508. A condensed income statement follows:

	1922	Increase or Decrease
Operating revenues	\$79,720,084	Inc. \$1,430,334
Operating expenses	67,164,593	Dec. 6,668,880
Net operating revenue	\$12,555,491	Inc. \$8,099,214
Operating ratio	(84.25%)	Dec. (10.06)
Tax accruals	2,571,276	Dec. 97,148
Uncollectible revenues	5,365	Dec. 1,961
Operating income	\$9,978,851	Inc. \$8,198,322
Rents from equipment (excluding freight cars)	467,120	Dec. 21,878
Joint facility rent income	167,337	Inc. 48,588
Total	\$10,613,308	Inc. \$8,225,032
Hire of freight cars—Debit balance	\$3,740,761	Inc. \$547,448
Rents for other equipment	447,334	Inc. 74,927
Joint facility rents	128,928	Dec. 95,397
Total	\$4,317,023	Inc. \$526,979
Net railway operating income	\$6,296,285	Inc. \$7,698,053
Other income	797,012	Dec. 250,982
Gross income	\$7,093,297	Inc. \$7,447,071
Other deductions	6,966,875	Dec. 27,437
Net income	\$126,422	Inc. \$7,474,508

Boston & Maine operations during 1922 were reviewed in an article entitled "Boston & Maine Shows Remarkable Improvement," which appeared in the *Railway Age* of February 24, page 469.

BUFFALO, ROCHESTER & PITTSBURGH.—Authorized to Issue Bonds.—The Interstate Commerce Commission has authorized an issue of \$1,920,000 of equipment bonds to be sold at not less than 96¾.

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC.—Asks Authority for Equipment Trust.—This company has applied to the Interstate Commerce Commission for authority to assume obligation and liability in connection with \$2,700,000 of 5 per cent equipment trust certificates to be sold to J. P. Morgan & Co., at 97.

CHICAGO, PEORIA & ST. LOUIS.—Abandonment Authorized.—The Interstate Commerce Commission has issued a certificate authorizing its receivers to abandon as to interstate and foreign commerce this railroad extending from Pekin, Ill., to East St. Louis, with branches making a total of 234 miles, together with certain track-age rights. The commission says that the record establishes that the receivers can no longer operate the line as an independent unit and that long continued deficits render further operation unsafe and impracticable and maintainable only by further dissipation of capital resources. No connecting trunk line has shown any interest in acquiring the line. It is assumed that the court having jurisdiction in the receivership will require the receivers to first offer the entire railroad for sale for continued operation and if no satisfactory bid on this basis is received, to offer it for sale in sections, for continued operation or as scrap or junk.

DENVER & RIO GRANDE WESTERN.—Equipment Trusts Sold.—Kuhn, Loeb & Co. and Blair & Co., Inc., are offering at 99¼ and dividends for average maturities, to yield 5½ per cent, \$4,500,000 5½ per cent equipment trust certificates, maturing in 15 annual instalments from March 1, 1924, to 1938, inclusive. The issuance of these certificates is subject to the approval of the Interstate Commerce Commission.

LOUISVILLE & NASHVILLE.—Stock Dividend of 62½ Per Cent.—The directors on March 15 declared a 62½ per cent stock dividend on the present outstanding \$72,000,000 capital stock, payable May 7 to holders of record April 16. This disbursement of \$45,000,000 will increase the road's outstanding capital to \$117,000,000. The Interstate Commerce Commission has already authorized the issuance of this stock dividend as noted in the *Railway Age* of March 3, 1923, page 501.

A semi-annual cash dividend of 2½ per cent was declared in advance, payable August 10 to stock of record July 17, placing the stock on a 5 per cent annual basis. This compares with 7 per cent

previously paid, but in view of the increase in stock, the present rate is equivalent to 8½ per cent.

After the meeting of the directors, Henry Walters, chairman of the board, issued the following statement:

Of the accumulated surplus of \$82,000,827 as shown in the balance sheet of the Louisville & Nashville of December 31, 1922, \$45,000,000 was this day capitalized by resolution of directors, and officers of the company were instructed to distribute same on May 7, 1923, pro rata to stockholders as registered upon stock books April 16, 1923, in the form of a stock dividend of 62½ per cent.

During the four years of the great war, and the three years following, railroad credit was very low and little or no construction or improvements were undertaken. Also, the coal miners' strike, followed by the machinists' strike in 1922, further interfered with the railroad managers' effort to recover the lost ground.

The Louisville & Nashville has authorized expenditures for additions and betterments, including equipment, since March 1, 1920, when the government relinquished its operation, aggregating over \$79,000,000. Of this aggregate, there remains to be provided over \$30,000,000, which will of necessity be increased by several millions before December 31, 1923. Much of the above is the deferred growth and maintenance of both roadway and equipment of necessity sacrificed to the imperative requirements of the war and inherited by the railroad managers when the government relinquished their operation.

The board anticipates that, if the net results of operation continue as favorable as in 1922, the rate of dividends can soon be increased. It will be noted that while the cash dividend declared is at the annual rate of only 5 per cent and seems a decrease, it will actually yield to the present stockholders a greater annual return, equal to a dividend of 8½ per cent instead of 7 per cent, because the new stock received from the stock dividend of 62½ per cent will also participate in the semi-annual cash dividend declared today, payable August 10, 1923.

PENNSYLVANIA.—Asks Authority for Equipment Trust Certificates.—This company has applied to the Interstate Commerce Commission for authority for the issuance of the \$31,500,000 of 5 per cent general equipment trust certificates sold to Kuhn, Loeb & Co., for 97¼.

PITTSBURGH & WEST VIRGINIA.—Annual Report.—Annual report for year ended December 31, 1922, shows a balance after 6 per cent preferred dividends of \$733,005 as compared with \$405,756 in 1921. Net operating income in 1922 was \$797,704 as compared with a net operating deficit in 1921 of \$827,198, but the 1921 figures show large items under the head of non-operating income. Selected items from the income statement follow:

	1922	1921
*Railway operating revenues	\$2,835,601	\$2,808,939
*Railway operating expenses	2,236,824	3,660,192†
Net revenue from railway operations	598,777	Dr. 851,252
*Railway tax accruals	365,285	321,891
Railway operating income	233,474	Dr. 1,173,230
*Hire of freight cars—Net credit	569,577	384,816
Net railway operating income	797,704	Dr. 827,198
Non-Operating Income:		
Dividend income	560,000	480,000
Gross income	1,438,587	1,012,382
Net income	1,277,247	949,998
Dividend appropriations of income	544,242	544,242
Income balance transferred to profit and loss	733,005	405,756

* Includes West Side Belt Railroad operation.

† Includes \$810,917 for rehabilitation of road and equipment.

SEABOARD AIR LINE.—Equipment Trusts Offered.—An issue of \$6,600,000 equipment trust gold certificates, series V., maturing serially 1923 to 1935, is offered at 100 and accrued dividends to yield 6 per cent, by Ladenburg, Thalmann & Co., Redmond & Co., Kissel, Kinnicutt & Co. and Freeman & Co. The certificates are redeemable at the option of the company on any interest date at 105 per cent of their face amount and accrued dividends.

Dividends Declared

Bangor & Aroostook.—Common, 2 per cent, payable April 1 to holders of record March 29; preferred, 1¼ per cent, quarterly, payable April 1 to holders of record March 15.

Cleveland, Cincinnati, Chicago & St. Louis.—Common, 1 per cent, quarterly, payable April 20 to holders of record March 30; preferred, 1¼ per cent, quarterly, payable April 20 to holders of record March 30.

Kansas City Southern.—Preferred, 1 per cent, quarterly, payable April 16 to holders of record March 31.

Old Colony Railroad.—1¼ per cent, quarterly, payable April 2 to holders of record March 17.

Philadelphia & Trenton.—2½ per cent, quarterly, payable April 10 to holders of record April 1.

St. Louis Southwestern.—Preferred, 1¼ per cent, quarterly, payable April 2 to holders of record March 24.

Trend of Railway Stock and Bond Prices

	Mar. 20	Last Week	Last Year
Average price of 20 representative railway stocks	69.06	68.83	61.18
Average price of 20 representative railway bonds	82.84	83.19	83.41

Annual Report

Norfolk and Western Railway Company—Twenty-Seventh Annual Report

ROANOKE, VA., March 14th, 1923.

To the Stockholders of the Norfolk and Western Railway Company:

Your Board of Directors submits the following report for the year ending December 31st, 1922.

MILEAGE OF ROAD AND TRACK IN OPERATION.

	DECEMBER 31, 1922 Miles	DECEMBER 31, 1921 Miles	IN- CREASE Miles
Main Line	1,542.69	1,542.69	
Branches			
{ Operated as second track..	127.28	127.28	
{ Other branches	531.28	531.28	
	658.56	658.56	
Total miles	2,201.25	2,201.25	
Lines operated under lease.....	21.03	21.03	
Lines operated under trackage rights.	15.60	15.60	
Total miles of road in operation....	2,237.88	2,237.88	
Second track	556.95	556.95	
Third track	11.41	11.41	
Sidings and yard tracks.....	1,530.44	1,522.37	8.07
Total miles of all tracks in operation	4,336.68	4,328.61	8.07
Average miles of road operated..	2,237.88	2,225.94	11.94
Average miles of track operated..	4,331.19	4,284.11	47.08

INCOME STATEMENT.

	1922	1921	INCREASE OR DECREASE	PER PER CENT
RAILWAY OPERATING INCOME:				
Rail Operations—				
Revenues:				
Freight	\$77,672,461.13	\$67,221,435.91	Inc. \$10,451,025.22	15.55
Passenger	9,191,620.31	10,077,720.19	Dec. 886,099.88	8.79
Mail	933,419.52	995,688.57	Dec. 62,269.05	6.25
Express	1,204,963.91	782,994.43	Inc. 421,969.48	53.89
All Other Transportation	485,727.55	479,691.31	Inc. 6,036.24	1.26
Total Transportation Revenues	\$89,488,192.42	\$79,537,530.41	Inc. \$9,930,662.01	12.48
Revenue from Operation other than Transportation ...	864,694.77	1,161,271.74	Dec. 296,576.97	25.54
Total Railway Operating Revenues....	\$90,352,887.19	\$80,718,802.15	Inc. \$9,634,085.04	11.94
RAILWAY OPERATING EXPENSES:				
Maintenance of Way and Structures....	\$12,564,606.25	\$11,783,698.54	Inc. \$780,907.71	6.63
Maintenance of Equipment	23,514,618.47	19,841,344.92	Inc. 3,673,273.55	18.51
Traffic	933,056.58	843,160.53	Inc. 89,896.05	10.66
Transportation	29,106,712.27	29,849,425.89	Dec. 742,713.62	2.49
Miscellaneous Operation	278,149.63	331,028.56	Dec. 52,878.93	15.97
General	1,773,753.61	1,842,026.29	Dec. 68,272.68	3.71
Transportation for Investment—Credit.	118,093.29	143,827.63	Dec. 25,734.34	17.89
Total Railway Operating Expenses....	\$68,052,803.52	\$64,346,857.10	Inc. \$3,705,946.42	5.76
Ratio of Expenses to Total Operating Revenues	75.32%	79.72%	Dec. 4.40%	
NET REVENUE FROM RAILWAY OPERATIONS	\$22,300,083.67	\$16,371,945.05	Inc. \$5,928,138.62	36.21
DEDUCT — RAILWAY TAX ACCRUALS.....	\$6,000,000.00	\$4,730,000.00	Inc. \$1,270,000.00	26.85
UNCOLLECTIBLE RAILWAY REVENUE	7,938.82	27,981.40	Dec. 20,042.58	71.65
RAILWAY OPERATING INCOME	\$16,292,144.85	\$11,613,963.65	Inc. \$4,678,181.20	40.28
ADD NON-OPERATING INCOME:				
Hire of Freight Cars—Net	\$2,161,001.85	\$2,680,685.41	Dec. \$519,683.56	19.39
Hire of Other Equipment—Net... ..	42,566.66	5,936.95	Inc. 36,629.71	616.98
Joint Facility Rents —Net.....	180,109.21	191,124.19	Dec. 11,014.98	5.76
	\$2,298,544.40	\$2,865,872.65	Dec. \$567,328.25	19.80
NET RAILWAY OPERATING INCOME.....	\$18,590,689.25	\$14,479,836.30	Inc. \$4,110,852.95	28.39

OTHER NON-OPERATING INCOME:

Income from Lease of Road	\$1,110.00	\$1,110.00		
Miscellaneous Rent Income	72,632.23	146,977.94	Dec.	\$74,345.71 50.58
Miscellaneous Non-Operating Physical Property	82,880.66	98,061.22	Dec.	15,180.56 15.48
Dividend Income....	3,648.65	1,666.66	Inc.	1,981.99 118.92
Income from Funded Securities	753,145.36	482,387.33	Inc.	270,758.03 56.13
Income from Unfunded Securities and Accounts....	269,876.49	379,578.30	Dec.	109,701.81 28.90
Miscellaneous Income	183.85	502.29	Dec.	318.44 63.40
Total other non-operating income..	\$1,183,477.24	\$1,110,283.74	Inc.	\$73,193.50 6.59
GROSS INCOME	\$19,774,166.49	\$15,590,120.04	Inc. \$4,184,046.45	26.84
DEDUCTIONS FROM GROSS INCOME:				
Rent for Leased Roads	\$100,619.95	\$98,802.63	Inc.	\$1,817.32 1.84
Miscellaneous Rents	1,149.40	811.05	Inc.	338.35 41.72
Interest on Funded Debt:				
Mortgage Bonds..	3,589,540.00	3,617,924.57	Dec.	28,384.57 .78
Convertible Bonds.	963,639.50	1,055,149.53	Dec.	91,510.03 8.67
Secured Notes....	50,000.00	150,000.00	Dec.	100,000.00 66.67
Equipment Obligations	454,609.40	536,088.75	Dec.	81,479.35 15.20
Interest on Unfunded Debt	14,141.77	7,837.98	Inc.	6,303.79 80.43
Miscellaneous Income Charges	45,477.56	80,324.32	Dec.	34,846.76 43.38
Total Deductions....	\$5,219,177.58	\$5,546,938.83	Dec.	\$327,761.25 5.91
NET INCOME	\$14,554,988.91	\$10,043,181.21	Inc. \$4,511,807.70	44.92
Dividends on Adjusted Preferred Stock	919,692.00	919,692.00		
INCOME BALANCE: Transferred to Profit and Loss	\$13,635,296.91	\$9,123,489.21	Inc. \$4,511,807.70	49.45
PROFIT AND LOSS STATEMENT.				
	1922	1921	INCREASE OR DECREASE	PER CENT
CREDITS:				
Balance, January 1.....	\$35,524,370.63	\$34,989,688.99	Inc.	\$534,681.64 1.53
Credit Balance from Income	13,635,296.91	9,123,489.21	Inc.	4,511,807.70 49.45
Unrefundable Overcharges	4,052.97		Inc.	4,052.97
Repayment by Pocahontas Coal & Coke Company, Advances for Mortgage Bond Interest	70,000.00	120,000.00	Dec.	50,000.00 41.67
Profit on Road and Equipment Sold..	16,455.97	45,298.65	Dec.	28,842.68 63.67
Donations for Construction of Sidings	41,797.47	382,038.49	Dec.	340,241.02 89.06
Miscellaneous Credits	59,108.43	77,985.30	Dec.	18,876.87 24.21
TOTAL CREDITS....	\$49,351,082.38	\$44,738,500.64	Inc. \$4,612,581.74	10.31
CHARGES:				
Dividend Appropriations of Surplus, Common Stock....	\$9,960,778.50	\$8,506,190.00	Inc.	\$1,454,588.50 17.10
Surplus Appropriated for Investment in Physical Property.	2,041,797.47	449,905.72	Inc.	1,591,891.75 353.83
Loss on Retired Road and Equipment	39,175.30	131,297.19	Dec.	92,121.89 70.16
Miscellaneous Debits	33,311.46	126,737.10	Dec.	93,425.64 73.72
TOTAL CHARGES....	\$12,075,062.73	\$9,214,130.01	Inc. \$2,860,932.72	31.05
Balance, December 31	\$37,276,019.65	\$35,524,370.63	Inc.	\$1,751,649.02 4.93
DETAIL OF DIVIDEND PAYMENTS.				
No. PAYABLE Adjustment Preferred	STOCK OF RECORD	PER CENT.	OUTSTANDING STOCK	AMOUNT OF DIVIDEND
75 May 19, 1922.....	April 29, 1922.....	1	\$22,992,300	\$229,923.00
76 August 19, 1922....	July 31, 1922.....	1	22,992,300	229,923.00
77 November 18, 1922..	October 31, 1922... 1		22,992,300	229,923.00
78 February 19, 1923..	January 31, 1923... 1		22,992,300	229,923.00
		4		\$919,692.00

Common Stock:—

Common Stock.						
67	March 18, 1922....	February 28, 1922.....	134	\$121,521,700	\$2,126,629.75	
68	June 19, 1922.....	May 31, 1922.....	134	121,906,900	2,133,370.75	
69	September 19, 1922.....	August 31, 1922.....	134	123,395,900	2,159,428.25	
70	December 19, 1922.....	November 29, 1922.....	134	127,802,900	2,236,550.75	
Extra	3	December 19, 1922.....	November 29, 1922.....	1	127,802,900	1,278,029.00
				8		\$9,934,008.50
Dividend adjustment on Common Stock issued in exchange for Convertible Bonds.....						26,770.00
						\$9,960,778.50

CAPITAL STOCK.

The aggregate amounts of Adjustment Preferred and Common capital stock authorized and issued, including 77 shares (\$7,700) of Adjustment Preferred stock and 24 shares (\$2,400) of Common stock held in the Company's treasury, were as follows:—

	AUTHORIZED	ISSUED	Par Value	Shares
Adjustment Preferred Stock.....	\$23,000,000		\$23,000,000	230,000
Common Stock	250,000,000		127,829,300	1,278,293
Totals, December 31st, 1922.....	\$273,000,000		\$150,829,300	1,508,293
Totals, December 31st, 1921	273,000,000		144,522,100	1,445,221
Increase (all Common Stock).....			\$6,307,200	63,072

The additional 63,072 shares of Common stock were issued in exchange for \$6,307,200. Convertible bonds, surrendered for conversion, as follows:

\$312,000	Convertible 10-20 Year 4 per cent. Gold Bonds of 1912;
1,019,000	Convertible 10-25 Year 4½ per cent. Gold Bonds of 1913;
4,976,206	Convertible 10-Year 6 per cent. Gold Bonds of 1919.

Of the \$122,170,700 authorized but unissued Common stock, \$13,011,700 was reserved for the conversion at par of a like amount of outstanding Convertible bonds.

On December 31st, 1922, your Company's stockholders numbered 13,504, an increase in the year of 694, or 5.4 per cent.

FUNDED DEBT.

The aggregate Funded Debt actually outstanding was as follows:—

	Dec. 31st, 1922	Dec. 31st, 1921	Decrease
Mortgage Bonds	\$82,622,500	\$83,183,000	\$560,500
Convertible Bonds (\$326,000 not now convertible)	13,337,700	18,162,900	4,825,200
Collateral Trust Notes.....		2,500,000	2,500,000
Equipment Trust Obligations....	7,257,500	9,266,000	2,008,500
	\$103,217,700	\$113,111,900	\$9,894,200

The decrease in the amount of Mortgage Bonds outstanding was due to the payment at maturity—January 1st, 1922—of outstanding First Mortgage Bonds of The Columbus Connecting and Terminal Railroad Company, \$554,500 (the remainder of the total issue of \$600,000 having been acquired by the Company prior to December 31st, 1921) and to the retirement by purchase of \$6,000 Norfolk and Western Railroad Company's General Mortgage Bonds, the par of which was paid by the Trustee of that mortgage out of the proceeds of sale of the Company's Experimental Farm at Ivor, Virginia, the premium and accrued interest on the bonds being paid by your Company. The purchase price of the property at Ivor, Va., was \$20,000, payable in three installments, all of which have now been paid.

The net decrease in the amount of Convertible Bonds outstanding was due to the sale of \$269,000 Convertible 10-20 Year 4% Gold Bonds of 1912 and \$1,213,000 Convertible 10-25 Year 4½% Gold Bonds of 1913, held in the Company's Treasury, and the conversion into Common stock of \$6,307,200 of Convertible bonds as described under the head of "Capital Stock." The proceeds of the sale of Convertible bonds were applied to reimburse the Company in part for capital expenditures previously made.

The decrease in the amount of Collateral Trust Notes was due to the redemption on May 1st, 1922, of the entire issue of Four Year 6 per cent. Secured Notes at 101 per cent. of par and accrued interest.

The decrease in the amount of Equipment Trust Obligations outstanding was due to payment at maturity of \$309,000 Equipment Trust Notes, Equipment Trust No. 54 and of \$990,000 Equipment Trust Certificates, Series of 1914, and to the acquisition by the Company of \$694,500 Equipment Trust Notes, Equipment Trust No. 54 and \$15,000 Equipment Trust Certificates, Series of 1914. \$150,000 of the Equipment Trust Notes and \$10,000 of the Equipment Trust Certificates had been acquired prior to December 31st, 1921.

The right of the holders of Convertible 10-20 Year 4 per cent. Gold Bonds to convert their bonds into Common stock ceased on August 31st, 1922. All of the bonds of said issue have been converted except \$41,000, which will mature for payment September 1st, 1932, unless earlier redeemed.

The right of the holders of Convertible 10-25 Year 4½ per cent. Gold Bonds and of Convertible 10-Year 6 per cent. Gold Bonds to convert their bonds into Common stock will terminate August 31st, 1923, and August 31st, 1929, respectively.

The following bonds were held in the treasury:
\$13,000 First Consolidated Mortgage 4 per cent. Bonds.
15,000 Equipment Trust 4½ per cent. Certificates, Series of 1914,
694,500 Equipment Trust 6 per cent. Notes, Equipment Trust No. 54.

On January 1st, 1922, The Columbus Connecting and Terminal Railroad Company's First Mortgage 5 per cent. Bonds matured and were paid. Pursuant to the terms of your Company's First Consolidated Mortgage, bonds secured by that mortgage were drawn from the Trustee in the proportion of \$1,000 First Consolidated Mortgage Bonds for each \$900 The Columbus Connecting and Terminal Bonds paid, the bonds so drawn aggregating \$666,000. Authority has been secured from the Interstate Commerce Commission to sell as many of these bonds as will realize as near as may be but not more than \$600,000. Any surplus of bonds will be returned to the Trustee. No sale of these bonds has as yet been made.

Pursuant to the terms of Equipment Trust Agreement of January 15th, 1920, between the Director General of Railroads, the Norfolk and Western Railway Company and the Guaranty Trust Company of New York, Trustee, your Company under date of November 1st, 1922, called for payment on January 15th, 1923, at 103 and interest all the outstanding Equipment Trust 6 per cent. Gold Notes issued under the said agreement, being the maturities of January 15th, 1924, to January 15th, 1935, inclusive, aggregating \$5,508,000. The notes were paid in accordance with this call.

ROAD AND EQUIPMENT.

The additions to cost of road and equipment during the year were \$10,733,606.66.

From the commencement of operations October 1st, 1896, to December 31st, 1922, the charges to your Company's property accounts for investment in road and equipment were \$196,265,738.90

There were also direct charges to Income for additions and betterments before June 30th, 1907, aggregating 12,856,272.67

Total additions to cost of road and equipment.... \$209,122,011.57

Of this total the sum of \$43,259,787.28 was provided by appropriations from Surplus Income since June 30th, 1907, and \$12,856,272.67 was provided by direct charges to Income.

The mileage of double track line in operation was unchanged from the preceding year.

The temporary agreement of lease from the Virginia Holding Corporation, covering 8 mallet freight locomotives and 500 all-steel flat bottom gondola cars, 200,000 lbs. capacity, of the approximate aggregate value of \$2,409,000, was canceled as of March 31st, 1922, and the 500 gondolas and 2 of the locomotives (the remaining 6 not having been constructed) were purchased from the Virginia Holding Corporation for the sum of \$1,852,080.

Under date of May 1st, 1922, an Equipment Trust Agreement, Series of 1922, was executed, covering 4,000 all-steel hopper coal cars, 140,000 lbs capacity, and 7 dining cars, of an approximate aggregate value of \$7,385,690. This equipment forms security for the issue of \$6,700,000 Equipment Trust 4½ per cent. Certificates, payable in ten annual installments of \$670,000 each from May 1st, 1923, to May 1st, 1932, inclusive, and guaranteed, principal and dividends, under authority of the Interstate Commerce Commission, by the Norfolk and Western Railway Company. The maturities of 1924 to 1932 inclusive were sold in January, 1923.

Your Company has leased from the Virginia Holding Corporation 1,000 steel underframe box cars, 100,000 lbs. capacity, 2,000 all-steel hopper coal cars, 140,000 lbs. capacity, 12 mountain type passenger locomotives and 30 mallet freight locomotives, of the approximate aggregate value of \$9,250,000. Of this equipment 1,503 of the hopper coal cars had been delivered to December 31st, 1922. A temporary agreement of lease with the Virginia Holding Corporation covering this equipment has been executed under date of October 1st, 1922. This will later be replaced by an equipment trust agreement in the usual form, to be known as Equipment Trust, Series of 1923, covering an issue of \$8,000,000 4½ per cent. certificates.

The new equipment received during the year was as follows:

1 freight locomotive (steam) (rebuilt as switching locomotive)
5,503 all-steel hopper cars, 140,000 lbs. capacity
318 all-steel side dump hopper cars, 100,000 lbs. capacity (rebuilt)
29 steel underframe cabin cars
3 maintenance of way camp cars (built with second-hand material)
6 maintenance of way flat cars (built with second-hand material)
2 tool cars (built with second-hand material)
4 automobile trucks

Of the new equipment, 1 freight locomotive (rebuilt as switching locomotive), 29 steel underframe cabin cars, 3 maintenance of way camp cars, 6 maintenance of way flat cars and 2 tool cars were built at your Roanoke shops.

ADDITIONS AND BETTERMENTS TO WAY AND STRUCTURES.

70.49 miles of track were laid with 130-lb. rail, making the total amount of track now laid with this weight of rail 114.93 miles.

221.46 miles of track were laid with 100-lb. rail, making the total amount of track now laid with this weight of rail 1,315.65 miles.

201,366 cubic yards of stone were used in standard ballasting on the main line.

A spur track 7,925 feet long with passing track and running track was constructed on Lambert Point Branch to permit development of water front property in Atlantic City Ward, Norfolk, Va.

Passenger and freight stations were built or enlarged at Luray and Bassett, Va., Adanac, W. Va., and Wheelersburg, Ohio. A transfer shed with platforms was constructed at Walton, Va.

A 1,500 ton capacity coaling station of reinforced concrete and steel, with sand storage and drying plant, was erected at Williamson, W. Va. Coaling stations of Norfolk type were erected at Lynchburg and South Boston, Va.

A compressor house was erected at Lynchburg and a storage shed at Roanoke, Va. An electric ash hoist was installed at Bluefield, W. Va. Yard office was extended at Ironton, material wharf was enlarged and three engine inspection pits were constructed at Portsmouth, Ohio. Also a large number of buildings used for bunk houses and dining rooms were erected at terminal points during the strike of the shopmen, many of which will be used permanently for other purposes.

A 400,000 gallon water tank was erected at Shenandoah, Va., and 50,000 gallon tanks were erected at White Post, Va., Dennis, N. C., and Columbus, Ohio.

Power house charging stations were erected at Mohawk and Vulcan, W. Va. Electric pumping plants were installed at Farmville and Lowry, Va.

Alternating current track circuits were installed between Tug and Wilmore, W. Va. Signal control wires between Naugatuck and Kenova, W. Va., were completed.

The east end of Grayson Tunnel, located west of Fries Junction, Va., was lined with timber.

A flood defense levee was constructed at Petersburg, Va., to protect railway yards and property from the overflow of Appomattox River.

2.18 miles of fencing were erected.

32 feet of light steel bridges were replaced by fit steel doubled.

Undergrade crossings were constructed at Rice, Farmville and Glade Spring, Va.

Six highway grade crossings were eliminated during the year, four by change of county road and two by undergrade crossings.

MAINTENANCE EXPENDITURES.

The expenses for Maintenance of Way and Structures were as follows:

	1922	1921	INCREASE	PER CENT.
Total Expenses	\$12,446,292.12	\$11,778,982.61	\$667,309.51	5.66
Average per mile of road operated	\$561.64	5,263.46	298.18	5.66
Average per mile of track operated	2,873.64	2,721.19	152.45	5.60

The expenses for Maintenance of Equipment were as follows:

	1922	1921	INCREASE OR DECREASE	PER CENT.
Total Maintenance of Equipment Expenses...	\$23,524,842.33	\$19,342,536.26	I. \$4,182,306.07	21.6
In which are included:				
Steam Locomotives (Freight): Repairs, retirements and depreciation	8,431,030.95	6,127,087.02	I. 2,303,943.93	37.6
Average per locomotive	9,384.70	6,792.78	2,591.92	38.2
Average per 1,000 locomotive miles	527.41	455.85	71.56	15.7
Electric Locomotives (Freight): Repairs, retirements and depreciation	311,453.52	492,337.27	D. 180,883.75	36.7
Average per locomotive	25,954.46	41,028.11	15,073.65	36.7
Average per 1,000 locomotive miles	752.35	1,399.98	647.63	46.2
Steam Locomotives (Passenger): Repairs, retirements and depreciation	1,514,620.70	1,221,756.95	I. 292,863.75	24.0
Average per locomotive	9,405.83	7,541.71	1,864.12	24.7
Average per 1,000 locomotive miles	301.50	239.33	62.17	25.9
Freight Train Cars: Repairs, retirements and depreciation	10,697,974.82	9,327,135.26	I. 1,370,839.56	14.7
Average per freight car	255.46	194.70	40.76	20.9
Average per 1,000 tons one mile	1.03	1.10	.07	6.4
Passenger Train Cars: Repairs, retirements and depreciation	999,617.70	764,545.97	I. 235,071.73	30.7
Average per passenger car	1,843.46	1,369.15	475.17	34.7
Average per 1,000 passengers one mile	3.81	3.79	.02	0.5
Work Equipment: Repairs, retirements and depreciation	203,194.94	151,308.29	I. 51,886.65	34.3

There were in the shops undergoing and awaiting repairs at the close of the year, 109 locomotives, or 10.0 per cent. (55 needing only light repairs), 26 passenger cars, or 4.6 per cent., and 1,318 freight and work equipment cars, or 2.7 per cent.

TRAFFIC AND OPERATING REVENUE COMPARISONS.

Comparison of traffic and operating revenue figures with those of the preceding year shows the following interesting changes:

		Per cent.
Number of passengers — 6,034,531 — decreased	480,417	7.37
Average haul of passengers — 43.38 miles — decreased	1.47 miles	3.28
Revenue from passenger fares — \$9,192,599.00 — decreased	\$885,288.07	8.78
Average rate per passenger per mile — 3.512 cents — increased	0.063 cents	1.83
Revenue freight carried — 37,357,078 tons — increased	7,672,143 tons	25.85
Average haul of freight — 278.99 miles — decreased	6.75 miles	2.36
Revenue from freight transportation — \$77,637,430.88 — increased	\$10,342,459.16	15.37
Average rate per ton per mile — 0.745 cents — decreased	0.048 cents	6.05
Average tons of revenue freight per train mile — 1,049.49 — increased	36.20 tons	3.57
Shipments of Coal — 28,126,196 tons — increased	6,347,784 tons	29.15
Shipments of Coke — 377,185 tons — increased	56,671 tons	17.68
Shipments of Ore — 534,703 tons — increased	366,252 tons	217.42
Shipments of Pig and Bloom Iron — 201,044 tons — increased	69,619 tons	52.97
Shipments of Lumber — 1,046,754 tons — increased	132,418 tons	14.48

THE SHOPMEN'S STRIKE.

On July 1st, following a decision of the United States Labor Board making reductions of from seven to nine cents per hour in the wages of the shop crafts, which, after this reduction ranged from 64.4 cents to 70.3 cents per hour, a general strike of shopmen was called, in response to which practically all of your Company's shopmen left the Company's service. The places of these men were gradually filled, partly from the ranks of the strikers, but more largely with new men, and the situation at the close of the year was close to normal. New shop organizations, composed of your Company's own employees, have been formed, with which agreements have been made, and it is confidently believed that increased efficiency and more harmonious relations will result.

The Norfolk and Western Railway, for the most part, is not located in an industrial section. There was therefore a large labor turnover before a regular, competent working force was secured. This involved extra cost, which reduced net revenue materially in the last few months of the year.

SETTLEMENT WITH UNITED STATES GOVERNMENT

No settlement has been made with the United States Government for the Federal Control and Guaranty Periods and no payments have been made by the Government on either account during the year. It is expected that settlements for both periods will be reached during the year 1923, but no close estimate can be made of the amounts which will be received.

OPERATING RESULTS.

Effective July 1st, 1922, a reduction of ten per cent. in freight rates was ordered by the Interstate Commerce Commission, which was reflected in the earnings of the last half of the year. Notwithstanding these reduced rates, total railway operating revenues for the year were \$90,352,887.19, the largest in the history of the Company, and \$9,634,085.04, or 11.94 per cent., in excess of 1921. This increase was in large measure due to the heavy coal movement in the early months of the year, resulting from the strike in the unionized bituminous coal fields, the mines on your Company's line being in continuous operation.

The tonnage of revenue coal carried in the year increased 6,347,784 tons

or 29.15 per cent., and other revenue freight showed an increase of 1,324,359 tons, or 16.75 per cent. Revenue passengers decreased 480,417 or 7.37 per cent. and the average haul of passengers decreased 3.28 per cent.

Operating expenses, which had been held down to a ratio of 67.07 per cent. in the first six months, were greatly increased in the closing months of the year largely as a consequence of the shopmen's strike, and this despite the reductions in wages authorized by the United States Labor Board; they reached a ratio of 83.88 per cent. for the six months July to December, inclusive. Mainly from this cause operating expenses for the year increased from \$64,346,857.10 in 1921 to \$68,052,803.52 in 1922 or 5.76 per cent. The net revenue from railway operations, \$22,390,083.67, was a gain of \$5,928,138.62 or 36.21 per cent. over the corresponding figures for 1921.

The following comparison of operating revenues and expenses by quarters will be of interest, the figures used being those of Corporate operation only:

	JAN.-MARCH	APRIL-JUNE	JULY-SEPT.	OCT.-DEC.
OPERATING REVENUES:				
Freight	\$17,205,046.89	\$23,114,885.57	\$19,931,023.32	\$17,421,505.35
Passenger, Mail and Express	2,354,572.58	2,716,753.22	3,077,219.06	3,181,458.88
Other	295,388.06	340,008.62	329,193.15	385,832.49
Totals	\$19,855,007.53	\$26,171,647.41	\$23,337,435.53	\$20,988,796.72
OPERATING EXPENSES:				
Maintenance of Way and Structures	\$2,598,460.08	\$3,025,979.55	\$3,341,010.71	\$3,599,155.91
Maintenance of Equipment	4,853,409.97	5,598,403.11	5,453,750.52	7,609,054.87
Transportation ..	6,539,884.92	6,819,899.66	7,610,927.84	8,135,999.85
Other	712,347.68	723,488.06	697,190.23	733,840.56
Totals	\$14,704,102.65	\$16,167,770.38	\$17,102,879.30	\$20,078,051.19
NET RAILWAY OPERATING REVENUES	5,150,904.38	10,003,877.03	6,234,556.23	910,745.53
Ratio of Operating Expenses	74.06%	61.78%	73.29%	95.66%

In the operating expenses for 1922, as compared with 1921, payrolls increased 8.1 per cent., cost of fuel decreased 24.1 per cent., and cost of other materials increased 25.1 per cent.

TAXES.

The charge to Revenues for taxes was \$6,000,000, the largest amount in the history of the Company, and an increase of \$1,270,000 or 26.85% over the year 1921, this increase being due to greater net earnings in 1922, a higher rate of income tax and an increase in the assessment of your Company's property in West Virginia. The charges for taxes and the yearly percentages of increase or decrease for the last seven years were as follows:

Year Ending	Charges For Taxes	Comparison with Preceding Year
December 31st, 1916	\$2,480,000	Increase 22.59 per cent.
" " 1917	5,095,000	Increase 105.44 "
" " 1918	4,620,000	Decrease 9.32 "
" " 1919	4,976,000	Increase 7.71 "
" " 1920	4,400,000	Decrease 11.58 "
" " 1921	4,730,000	Increase 7.50 "
" " 1922	6,000,000	Increase 26.85 "

The charge for taxes for the year 1922 was 141.94 per cent. greater than for the year 1916.

The percentage of Net Operating Revenues consumed by taxes for the year ending December 31st, 1922, was 26.86 per cent. This compares with a percentage of taxes to Net Operating Revenues of 9.56 per cent. in 1916.

RETURN UPON INVESTMENT.

The following table shows for the last twelve and one-half years the percentage ratio of Net Railway Operating Income to Railway Property Investment, including in Railway Property Investment expenditures for Additions and Betterments charged directly to Income or to reserves created from Income before July 1st, 1907, from which date the accounting classifications of the Interstate Commerce Commission have required all similar expenditures to be charged to Property Investment accounts, and also including the value of Material and Supplies on hand at the close of each year. The Net Railway Operating Income upon which the percentages are based follows the definition in the Transportation Act and is made up of Net Revenue from Railway Operations deducting Railway Tax Accruals and Uncollectible Railway Revenues and adding Equipment and Joint Facility Rents.

For 1918 and subsequent years the table includes operating results of or for account of the Federal Government.

FOR	Railway Property Investment including Material and Supplies*	Net Railway Operating Income	Return on Investment
Fiscal years ending:			%
June 30th, 1911	\$235,850,555.46	\$12,120,548.83	5.14
June 30th, 1912	242,656,045.04	13,668,435.17	5.63
June 30th, 1913	255,414,078.05	14,855,906.73	5.82
June 30th, 1914	269,100,666.12	14,020,688.16	5.21
June 30th, 1915	275,329,352.26	14,359,734.84	5.22
June 30th, 1916	283,394,811.71	24,045,710.03	8.48
Calendar years ending:			
December 31st, 1916	287,406,380.10	24,866,782.43	8.65
December 31st, 1917	303,327,414.78	21,928,005.74	7.23
December 31st, 1918	317,950,562.76	16,450,087.35	5.17
December 31st, 1919	326,047,116.71	8,176,537.94	2.51
December 31st, 1920	342,544,618.29	3,612,843.10	1.05
December 31st, 1921	348,091,045.54	14,870,020.43	4.27
December 31st, 1922	357,551,199.45	18,624,467.57	5.21

*Includes Investment in Company Mines, which produce fuel coal for use of Norfolk and Western Railway Company only, but does not include any Working Capital.

FEDERAL VALUATION.

The physical valuation of your Company's property under the Federal law, including the prescribed record of property changes under Valuation Order No. 3, has cost your Company since June 30th, 1916, the date of Valuation, to December 31st, 1922, \$720,428.13.

Conferences between the representatives of your Company and the Government are in progress, and it is expected that the completed report of the Government will be received during the first part of April, to be soon followed by its tentative valuation.

INSURANCE RESERVE.

With the return of your Company's property by the United States Railroad Administration on March 1st, 1920, an insurance reserve was inaugurated to provide in part for property losses by fire. Under the plan adopted your Company assumes the entire risk on all insurable items under \$1,000, 50 per cent. of the risk on insurable items in excess of \$1,000 of limited exposure and 10 per cent. of all items in excess of \$1,000 where because of large or congested items the risk is greater. It also assumes 50 per cent. of the risk on all rolling stock and on merchandise in transit.

The following table shows the results of the operation of the Insurance Reserve since its inauguration.

	CREDITS	DEBITS.			NET CREDIT
		RE-INS. PREMIUMS	FIRE LOSSES	TOTAL	
10 Months ending Dec. 31st, 1920	\$60,094.91	\$19,286.70	\$30,217.16	\$49,503.86	\$10,591.05
12 Months ending Dec. 31st, 1921	59,695.71	1,263.81	19,034.43	20,298.24	39,397.47
12 Months ending Dec. 31st, 1922	55,859.28	1,310.90	20,480.47	21,791.37	34,067.91
Net Credit December 31st, 1922					\$84,056.43

POCAHONTAS COAL AND COKE COMPANY.

Under the sinking fund provision of the Pocahontas Coal and Coke Company Purchase Money First Mortgage, dated December 2nd, 1901, the sum of \$318,735.31 accrued from royalties on coal mined during the calendar year 1922. From the beginning of the operation of the sinking fund in 1906 to December 31st, 1922, the accruals from royalties have aggregated \$4,347,848.14 and those from sales of lands \$147,095.00, a total of \$4,494,943.14 applicable to the purchase and retirement of mortgage bonds. Through this fund \$4,738,000 of bonds had been purchased and canceled to December 31st, 1922. Additional bonds amounting to \$390,000 were purchased and canceled in February, 1923.

A further payment of \$105,000 has been made on account of indebtedness incurred in previous years to meet fixed charges.

The consolidation of the Company's properties through purchases of interior tracts and exchanges of lands with other companies, and the work of completing titles, surveying, monumenting and mapping, continue.

RELIEF AND PENSION DEPARTMENT.

At the end of the year the Relief Fund had 14,131 members, equivalent to 51.15 per cent. of the total number of employees, a decrease in the year in number of members of 86 and in percentage of members to employees of 11.39 per cent. The Fund paid during the year in accident death benefits \$16,000.00, in sickness death benefits \$107,215.50, in accident disability benefits \$58,339.85 and in sickness disability benefits \$245,048.65, a total of \$426,604.00.

In the same period the Company paid for maintenance expenditures of the Relief and Pension Department the sum of \$95,484.44 and the members of the Fund contributed the sum of \$509,105.75. Interest on monthly balances in the hands of the Treasurer of the Company amounted to \$2,443.85 and interest from investments \$9,324.33. A full financial statement of the Relief Fund, which has been audited by a Committee from the contributing members, will be found on page 27 of this report.

From the date of organization of the Relief Fund, July 1st, 1917, a total amount of \$2,086,199.98 has been paid out for death and disability benefits and in the same period the Company has paid the sum of \$499,518.48 for maintenance expenditures of the Department.

On December 31st the number of employees on the Pension Roll was 453. The total amount paid in pensions for the year ending December 31st was \$200,742.27.

TRACKAGE AGREEMENT WITH CHESAPEAKE AND OHIO RAILWAY COMPANY.

Under agreement dated July 21st, 1915, The Chesapeake and Ohio Northern Railway Company was granted trackage rights for through freight trains over your company's line between Waverly, Ohio, and Valley Crossing, Ohio, a distance of 61.86 miles. This arrangement has operated to the mutual satisfaction of the two companies, but in order to adjust certain provisions to meet changed conditions, a new agreement was entered into between your Company and The Chesapeake and Ohio Railway Company, successor to The Chesapeake and Ohio Northern Railway Company, under date of September 16th, 1922. The new agreement runs for five years and may be terminated at that time or thereafter by either party upon two years' notice.

TIMBER PRESERVING PLANT.

The timber preserving plant completed last year at East Radford, Va., is in successful operation and the results obtained are very satisfactory. The method used is what is known as the Rueping process and the cross-ties, which are the principal item of treatment, receive a good average penetration of about two inches. An average of about two-thirds of your Company's annual requirement for ties is being treated.

The following timber was treated during the year:

745,931 cross-ties.
1,545 bridge ties.
1,700,000 tie plugs.
26,388 feet switch timber.
5,170 lineal feet piling.

INDUSTRIES.

Among the new local industries are the following:—

- 16 manufactories of mineral, metal and other products,
- 39 manufactories of lumber products,
- 24 manufactories of farm implements and farm products,
- 15 coal mines.

At the close of the year there were 221 companies organized for producing coal and coke on your Company's lines, with a total of 328 separate mines, of which 324 were in actual operation.

Of the 9,731 coke ovens, 1,052 were in blast.

Of the 17 iron furnaces with a total daily capacity of 3,555 tons of pig, 8 having a total daily capacity of 2,200 tons were in blast.

CHANGE IN BOARD OF DIRECTORS.

At the annual meeting of stockholders held April 13th, 1922, the vacancy in the Board of Directors occasioned by the death of Joseph Wood, was filled by the election of S. P. Bush of Columbus, Ohio.

CHANGES IN ORGANIZATION.

On February 15th, 1923, pursuant to the Company's Pension Regulations, E. A. Blake, General Superintendent, Eastern Division, was retired.

J. E. Crawford, formerly Chief Engineer, was appointed Assistant General Manager; J. T. Carey, formerly General Superintendent, Western Division, was appointed General Superintendent, Eastern Division; H. C. Weller, formerly Superintendent of the Scioto Division, was appointed General Superintendent, Western Division; W. P. Wiltsee, formerly Principal Assistant Engineer, was appointed Acting Chief Engineer, these changes all being effective February 16th, 1923.

By order of the Board of Directors,

N. D. MAHER,
President.

ADDITIONS TO COST OF ROAD AND EQUIPMENT.

ROAD AND GENERAL EXPENDITURES	HOW PAYABLE		TOTALS
	FROM APPROPRIATED SURPLUS	FROM CAPITAL OBLIGATIONS	
Branches and Extensions:—			
Low Grade Line, Burkeville to Pamplin, Va.		\$26.20	\$26.20
Lewis Creek Branch, Va.		7,855.72	7,855.72
Lenore Branch, W. Va.		10,060.82	10,060.82
Tug River and Kentucky R. R.—W. Va.		3.00	3.00
Williamson and Pond Creek R. R.—W. Va.		3.00	3.00
Total Branches and Extensions..		\$17,936.74	\$17,936.74
Right of Way and Station Grounds		212,990.14	212,990.14
Protection of Banks and Drainage.	\$109.00	10,091.30	10,191.30
Tunnel Improvements		9,779.19	9,779.19
Bridges, Trestles and Culverts....		13,476.67	13,476.67
Rails and Fastenings.....		1,277,153.78	1,277,153.78
Improved Ballast		251,864.10	251,864.10
Additional Main Tracks.....		100,530.05	100,530.05
Sidings and Spur Tracks.....	41,697.47	48,867.55	90,565.02
Terminal Yards		225,043.13	225,043.13
Fencing Right-of-Way		819.47	819.47
Elimination of Grade Crossings...		148,419.99	148,419.99
Block and Other Signal Apparatus.		113,078.58	113,078.58
Stations, Office Building and Fixtures		136,815.53	136,815.53
Shops, Enginehouses and Turntables		80,107.21	80,107.21
Shop Machinery and Tools.....		70,797.87	70,797.87
Water and Fuel Stations.....		222,379.16	222,379.16
Dock and Wharf Property.....		93,801.26	93,801.26
Electric Power Transmission.....		13,337.44	13,337.44
Roadway Buildings		15,965.52	15,965.52
Roadway Machines		31,022.06	31,022.06
Tie Treating Plant.....		36,298.90	36,298.90
Flood Defense		19,267.24	19,267.24
Other Additions and Betterments..		64,480.98	64,480.98
Total.....			
{ Road	\$3,212,907.99		
{ Gen. Expend.	43,213.34	\$41,797.47	\$3,214,323.86
			\$3,256,121.33

EQUIPMENT:—

Expenditures for New Equipment under contracts completed within the year or under construction at the end of the year.....	\$132,548.35
Equipment under Equipment Trust 1922	7,122,052.80
Equipment under Equipment Trust 1923	2,895,461.29
Cost of rebuilding Freight Equipment	930,232.19
Cost of change in classification of Equipment	35,594.13
Application of improved parts—Locomotives	53,812.05
Application of improved parts—Freight Train Cars.....	49,676.79
Application of improved parts—Passenger Train Cars.....	48,983.99
Application of improved parts—Work Equipment	4,740.87
Total	\$11,201,914.20

Deduct for Equipment destroyed, sold or retired:—

Net Value	\$1,351,712.37
Salvage	696,023.44
Depreciation	1,676,693.06
	3,724,428.87

Total Equipment

Total Road and Equipment.....

7,477,485.33

\$10,733,606.66

NORFOLK AND WESTERN RAILWAY COMPANY CONDENSED GENERAL BALANCE SHEET, DECEMBER 31ST, 1922.
ASSETS

ASSETS		COMPARISON WITH DEC. 31st, 1921	
INVESTMENTS:—			
Investment in Road and Equipment:			
Road	\$237,044,607.32	I.	\$3,256,121.33
Equipment	91,778,257.11	I.	7,477,485.33
			\$328,822,864.93
Deposits in lieu of mortgage property sold.....		D.	273.43
Miscellaneous Physical Property		I.	127,299.27
Investments in Affiliated Companies:—			
Stocks	1,454,171.42	I.	1,700.00
Bonds	323,441.25	I.	112,319.25
Advances	13,496,078.36	I.	9,892,188.61
			15,273,691.03
Other Investments:—			
Stocks	4,696.40		
Bonds	15,953,301.15	I.	3,556,332.17
			15,957,997.55
Total Investments			\$363,766,281.79
CURRENT ASSETS:—			
Cash	2,903,576.18	D.	2,688,050.69
Special Deposits		D.	600,000.00
Loans and Bills Receivable.....	281,232.28	D.	397,401.58
Traffic and Car Service Balances Receivable.....	1,892,225.89	D.	571,538.89
Net Balances Receivable from Agents and Conductors.....	868,297.61	I.	219,493.91
Miscellaneous Accounts Receivable:—			
Due from U. S. R. R. Administration.....	\$7,152,440.65		
Due from U. S. Government under Sec. 209, Trans. Act 1920.....	4,225,593.98		
Other Accounts	2,304,903.42		
	13,682,938.05	D.	1,126,693.82
Material and Supplies.....	11,291,187.33	D.	1,411,524.07
Interest and Dividends Receivable.....	51,548.34	I.	4,696.08
Other Current Assets.....	34,561.62	D.	3,321.38
Total Current Assets.....			31,005,567.30
DEFERRED ASSETS:—			
Working Fund Advances.....	8,590.43	D.	6,181.44
Norfolk and Western Railway Company and Pocahontas Coal and Coke Company Joint Purchase Money Mortgage Bonds.....	15,262,000.00	D.	305,000.00
Securities held in trust for Relief and Pension Department.....	325,000.00	I.	104,000.00
Temporary Advance to Virginia Holding Corporation.....		D.	1,852,080.00
Other Accounts	13,000.00	I.	13,000.00
Total Deferred Assets.....			15,608,590.43
UNADJUSTED DEBITS:—			
Rents and Insurance Premiums Paid in Advance.....	34,783.34	I.	17,998.77
Other Unadjusted Debits.....	1,009,647.81	D.	45,481.20
Securities Issued or Assumed—Unpledged—			
Par value of holdings at close of year.....	\$1,398,600.00		
Total Unadjusted Debits.....			1,044,431.15
			\$411,424,870.67
LIABILITIES			
CAPITAL STOCK:—			
Adjustment Preferred	\$23,000,000.00		
Held in Treasury.....	7,700.00		
Common	\$127,829,300.00		
Held in Treasury.....	2,400.00		
	127,826,900.00	I.	\$6,307,200.00
			\$150,819,200.00
LONG TERM DEBT:—			
Mortgage Bonds	\$83,301,500.00		
Held in Treasury.....	679,000.00		
	82,622,500.00	D.	560,500.00
Convertible Bonds	\$13,337,700.00	D.	4,825,200.00
	13,337,700.00	D.	2,500,000.00
Secured Notes			
Equipment Obligations	\$7,967,000.00		
Held in Treasury.....	709,500.00		
	7,257,500.00	D.	2,008,500.00
			103,217,700.00
CURRENT LIABILITIES:—			
Loans and Bills Payable.....	2,250,000.00	I.	2,250,000.00
Traffic and Car Service Balances Payable.....	263,217.20	I.	155,857.72
Audited Accounts and Wages Payable.....	5,227,084.76	I.	2,367,734.51
Miscellaneous Accounts Payable.....	488,041.96	I.	66,171.77
Interest Matured Unpaid.....	520,510.50	D.	3,858.00
Dividends Matured Unpaid.....	10,360.50	D.	10,565.50
Funded Debt Matured Unpaid.....	6,000.00		
Unmatured Dividends Declared.....	229,923.00		
Unmatured Interest Accrued.....	1,124,376.50	D.	153,619.83
Total Current Liabilities.....			10,119,514.42
DEFERRED LIABILITIES:—			
Due U. S. R. R. Administration—Material and Supplies.....	1,948,404.52	D.	7,446.99
Securities held in Trust for Relief and Pension Department.....	325,000.00	I.	104,000.00
Liability for Equipment received under Temporary Leases.....		D.	1,852,080.00
Liability for Equipment under Equipment Trust "1922".....	7,122,052.80	I.	7,122,052.80
Liability for Equipment under Equipment Trust "1923".....	2,895,461.29	I.	2,895,461.29
Other Accounts	40,611.62	I.	33,668.20
Total Deferred Liabilities.....			12,331,530.23
JOINT LIABILITIES:—			
Norfolk and Western Railway Company and Pocahontas Coal and Coke Company Joint Purchase Money Mortgage Bonds.....		D.	305,000.00
			15,262,000.00
UNADJUSTED CREDITS:—			
Tax Liability	3,256,227.76	I.	1,210,702.20
Insurance and Casualty Reserves.....	654,650.23	I.	167,936.92
Accrued Depreciation—Road	9,102,064.90	I.	833,859.89
Accrued Depreciation—Equipment	24,880,372.97	I.	873,503.28
Accrued Depreciation—Miscellaneous Physical Property.....	247,990.99	I.	75,375.22
Other Unadjusted Credits.....	997,812.24	D.	255,111.75
Total Unadjusted Credits.....			39,139,119.09
CORPORATE SURPLUS:—			
Additions to Property through Income and Surplus:—			
Road	\$19,954,761.01		
Equipment	23,305,026.27		
	43,259,787.28	I.	2,041,797.47
Profit and Loss Balance.....	37,276,019.65	I.	1,751,649.02
Total Corporate Surplus.....			80,535,806.93
			\$411,424,870.67

[ADVERTISEMENT]

Railway Officers

Executive

D. E. Galloway has been appointed chief assistant to the president of the Canadian National with headquarters at Montreal.

John Pullen, president of the Canadian National Express Company, has retired under the pension plan of the company, and **C. A. Hayes** has been appointed general manager of the express department of the Canadian National Railways.

G. T. Bell, whose appointment as executive assistant to the vice-president of the Canadian National was announced in the *Railway Age* of March 17, page 792, was born on September 7,

1861, at Montreal. He entered railway service in 1880 as a car mileage clerk for the Great Western Railway (later Grand Trunk) at London, Ont. He later went to Hamilton, Ont., as a stenographer and rate clerk in the passenger department. In 1882 he became chief clerk to the assistant general passenger agent of the Grand Trunk at Toronto. In 1885 he was transferred in a similar capacity to the office of the general passenger agent at Montreal. In 1892 he was promoted to assistant general pas-



G. T. Bell

senger agent. In 1900 he became general passenger and ticket agent. In 1908-1909 he also served the Grand Trunk Pacific in the same capacity. In 1909 he was promoted to assistant passenger traffic manager of both roads. From May, 1913, to the time of his recent appointment with the Canadian National he served the Grand Trunk as passenger traffic manager.

Financial, Legal and Accounting

R. A. C. Henry has been appointed director of the newly created bureau of economics of the Canadian National with headquarters at Montreal.

E. P. Mallory has been appointed director of the bureau of statistics of the Canadian National, with headquarters at Montreal. Mr. Mallory will report directly to the president, Sir Henry Thornton.

H. B. Fink, cashier of the Atchison, Topeka & Santa Fe, with headquarters at Topeka, Kan., has been promoted to assistant treasurer with the same headquarters, succeeding A. D. Gray, deceased.

E. J. Johnson, chief clerk in the office of the auditor of passenger receipts of the Northern Pacific at St. Paul, Minn., has been promoted to auditor of passenger receipts, with headquarters at St. Paul, succeeding **George Sherriff**, retired. **Charles Mitchell**, claim clerk in the freight claim department at Tacoma, Wash., has been promoted to assistant auditor of freight over-charge claims, with headquarters at Seattle, Wash.

Operating

R. H. Fish, whose appointment as general superintendent of the Southwestern Ontario district of the central region of the Canadian National was announced in the *Railway Age* of March 10, page 592, was born on June 12, 1873, at Oakville, Ont. He entered railway service in 1891 with the Grand

Trunk on construction work at Toronto. Later he became a cleaner in the motive power department and was promoted to fireman in 1893. Seven years later he was advanced to engine-man. In 1908 he was appointed acting road foreman at London, Ont., and in 1911 became road foreman with the same headquarters. In 1913 he was promoted to trainmaster at Brantford, Ont., and was advanced to superintendent at Stratford, Ont., in 1916. In 1920 Mr. Fish was appointed general superintendent of the Grand Trunk with headquarters at Montreal and in October, 1922, was transferred in a similar capacity to Toronto. He held this position until his recent appointment with the Canadian National.

L. S. Brown, whose appointment as general manager of the Atlantic region of the Canadian National with headquarters at Moncton, N. B., was announced in the *Railway Age*



L. S. Brown

of March 10, page 592, was born on October 19, 1863, at Nelson, N. B. He attended high school at Newcastle, N. B., and entered railway service in December, 1880, with one of the predecessors of the Canadian National at Newcastle. His first work was in the mechanical department and soon thereafter, he became a yard foreman and after mastering telegraphy was appointed assistant agent at Newcastle. In 1883 he was appointed dispatcher at Campbellton, N. B. In 1898 he was appointed chief dispatcher at New Glasgow, N. S., and in 1912 was advanced to assistant superintendent at Newcastle. The following year he was promoted to superintendent at New Glasgow and in 1917 he became assistant general superintendent at Moncton. In 1917 he became general superintendent and in 1920 assistant general manager at Montreal. In this latter capacity he was serving at the time of his promotion to general manager of the Atlantic region.

Traffic

W. E. Duperow, whose appointment as passenger traffic manager of the Central region of the Canadian National with headquarters at Toronto was announced in the *Railway Age*



W. E. Duperow

of March 17, page 792, was born on September 4, 1872, at Stratford, Ont. He was educated in the public and collegiate schools and commercial college and entered railway service in 1893 with the Grand Trunk at Seaforth, Ont. The following year he went to London, Ont., as a ticket clerk. From 1896 to 1898 he served in the same capacity at Toronto. Then for a year he was theatrical and excursion clerk in the district passenger agent's office. Then, until 1907, he served as general manager, secretary and treasurer of the Huntsville, Lake of Bays and Lake Simcoe Navigation Company at Huntsville, Ont. From the latter date to 1910 he was traveling passenger agent of the Grand Trunk at Toronto. Then for two years he was city passenger and

ticket agent of the Grand Trunk Pacific at Victoria, B. C. From 1912 to 1914 he was general agent of the passenger department with the same headquarters. He was then assistant general passenger agent at Winnipeg for three years when he was appointed general passenger agent with the same headquarters. In 1920 he became general passenger agent of the Canadian National and served in that capacity until the time of his recent appointment.

R. Creelman, whose appointment as passenger traffic manager of the Western region of the Canadian National with headquarters at Winnipeg was announced in the *Railway Age* of March 17, page 792, was born on December 18, 1875, at Durham, Ont. He entered railway service in August, 1891, as a clerk in the office of the city freight agent of the Grand Trunk at Toronto. From 1892 to 1896 he was ticket clerk at Toronto. For three years he acted as chief clerk in the office of the district passenger agent. In 1900-1901 he was a clerk in the general passenger department of the Canadian Pacific at Winnipeg. From 1901-1903 he was rate clerk for the Canadian Northern. Then for three years he served the Northern Pacific as a city ticket agent. From 1906 to 1909 he was traveling passenger agent of the Canadian Northern at St. Paul, Minn. Then for two years he was assistant general passenger agent of the same road at Winnipeg. From 1911 to 1918 he was general passenger agent of the company's western lines. From 1918 to 1920 he was assistant passenger traffic manager at Winnipeg. From the latter date until the time of his recent appointment he served as assistant passenger traffic manager of the Canadian National with headquarters at Winnipeg.

J. P. Marion has been appointed district passenger agent of the Canadian National with headquarters at Montreal.

George B. Carbrej has been appointed assistant general agent of the passenger department of the Canadian Pacific with headquarters at New York. Mr. Carbrej was born at Peabody, Mass., on July 12, 1887, and was educated in the public and high schools of Peabody and at the Burdette College, Boston, Mass. He entered the service of the Canadian Pacific in Boston as a junior clerk in June, 1906, and served thereafter as a stenographer and typist until 1909 when he was promoted to ticket clerk. In May, 1911, he was appointed ticket agent and in August, 1913, as chief clerk of the Boston office. In October, 1916, Mr. Carbrej was transferred to the company's New York passenger office as chief clerk and served in that capacity until the time of his recent promotion.

W. J. Moffatt has been appointed general agent, passenger department of the Canadian National with headquarters at Toronto.

C. K. Howard has been appointed general tourist agent of the Canadian National with headquarters at Montreal.

E. S. Davies has been appointed general agent, passenger department of the Canadian National with headquarters at Montreal.

H. C. Martin, whose appointment as general freight traffic manager of the Canadian National with headquarters at Montreal was announced in the *Railway Age* of March 17, page 792, entered railway service in 1888 in the local freight office of the Grand Trunk at Chicago. He later served as agent for the joint fast freight line of the Delaware, Lackawanna & Western and the Grand Trunk and as chief of the tariff bureau and assistant general freight agent of the Western lines of the Grand Trunk. In 1911 he was promoted to general freight agent of the Grand Trunk with headquarters at Montreal and served in that capacity until 1919, when he was promoted to freight traffic manager of the Eastern lines of this company in which capacity he was serving at the time of his recent appointment on the Canadian National.

L. M. Coffey has been appointed general agent of the New York Central, with headquarters at Kansas City, Mo., succeeding J. H. Love, resigned.

A. T. Weldon, whose appointment as traffic manager of the Atlantic region of the Canadian National, with headquarters at Moncton, N. B., was announced in the *Railway Age* of March 17, page 792, was born on March 6, 1876, at Dorchester, N. B. He entered railway service as a car checker in the local freight office of the Intercolonial at Moncton in 1890. In 1901 he was appointed chief clerk to the division freight agent at Halifax, N. S. In 1907 he became division freight agent at that point. From 1909 to 1914 he was general freight and passenger agent of the Black Diamond Steamship Line. He then became assistant general freight agent for the Canadian Government Railways at Moncton and in 1917 was advanced to general freight agent. In 1919 he became assistant freight traffic manager of the Canadian National and served in that capacity until the time of his recent promotion.

L. A. DeCou has been appointed general agent in charge of the freight and passenger office of the Lehigh Valley with headquarters at 410 Hoge building, Seattle, Wash.

J. K. McCaskell, trainmaster of the Louisville & Nashville with headquarters at Pensacola, Fla., has been promoted to assistant superintendent with the same headquarters and will be succeeded by **Monroe Campbell**, chief dispatcher, with the same headquarters, who will be succeeded by **C. J. Rice**.



R. Creelman



H. C. Martin



George P. Carbrej



A. T. Weldon

L. E. Poley, freight traffic agent of the Nashville, Chattanooga & St. Louis, with headquarters at Kansas City, Mo., has been promoted to general agent, with headquarters at Denver, Col.

T. J. Connell, district passenger agent of the Southern, with headquarters at St. Louis, Mo., has been promoted to division passenger agent, with the same headquarters. **B. H. Todd**, district passenger agent, with headquarters at Louisville, Ky., has been promoted to division passenger agent, with the same headquarters.

H. H. Melanson, whose appointment as general passenger traffic manager of the Canadian National with headquarters at Montreal was announced in the *Railway Age* of March 17,



H. H. Melanson

page 792, was born on March 9, 1872, at Scoudouc, N. B. He was educated at St. Joseph's College at Memramcook, N. B., and entered railway service in 1889 as a clerk in the mechanical department of the Intercolonial (one of the predecessors of the Canadian National). From 1892 to 1899 he served the same company as a rate clerk in the passenger department, and from 1899 to 1901 was chief clerk in the department. In 1903 he was appointed general baggage agent. From 1903 to 1909 he was chief clerk in the passenger department. During the latter year he was promoted to assistant general passenger agent. From 1913 to 1917 he was general passenger agent and in June of the latter year was appointed passenger traffic manager. From November, 1918, to the time of his recent promotion he served the Canadian National as passenger traffic manager.

C. W. Johnston, whose appointment as passenger traffic manager of the Canadian National with headquarters at Montreal was announced in the *Railway Age* of March



C. W. Johnston

17, page 792, was born on July 27, 1879, at Avondale, Que. He was educated at St. Francis College, Richmond, Que., and entered railway service in 1895 as a clerk and telegraph operator for the Grand Trunk at that place and served in that capacity until 1899. He then served as a telegraph operator and agent in the Portland district and at Sherbrooke, Que. He then served as a ticket clerk at Montreal and in 1902 was appointed traveling passenger agent. In 1906 and 1907 he served as an excursion clerk and during the latter years was again appointed traveling passenger agent. In 1909 he became chief clerk to the general passenger agent at Winnipeg. Thereafter he served in a similar capacity in the offices of the assistant passenger traffic manager and the passenger traffic manager. In 1914 he was appointed assistant to the passenger traffic manager at Montreal and in 1915 was advanced to assistant general passenger agent, in which position he was serving at the time of his recent appointment.

L. G. Scarboro, commercial agent of the Atlanta, Birmingham & Atlantic, with headquarters at Birmingham, Ala., has been promoted to general agent, with the same headquarters. **J. H. Dolvin**, traveling freight and passenger agent, with headquarters at Birmingham, has been promoted to commercial agent, with the same headquarters, succeeding Mr. Scarboro.

R. B. Cunningham, division freight agent of the Atchison, Topeka & Santa Fe, with headquarters at Topeka, Kan., has been promoted to assistant general freight agent, with the same headquarters. **W. H. Turner**, division freight agent with headquarters at Atchison, Kan., has been transferred to Topeka, succeeding Mr. Cunningham. **F. L. Condit**, traveling freight agent, with headquarters at Oklahoma City, Okla., has been promoted to division freight agent, with headquarters at Atchison, Kan., succeeding Mr. Turner. **Clark Davis**, traveling freight agent, with headquarters at Hutchinson, Kan., has been promoted to division freight agent, with the same headquarters. **G. W. Vetter** has been appointed assistant division freight agent, with headquarters at Kansas City, Mo.

Mechanical

P. W. Kiefer, assistant engineer in the mechanical department of the New York Central, has been appointed to the new office of assistant engineer of rolling stock, with headquarters at New York. **H. I. Wood**, chief draftsman, has been appointed assistant engineer to succeed Mr. Kiefer.

G. O'Connell has been appointed superintendent of work equipment of the Canadian National with headquarters at Toronto, Ont. **W. H. Secord**, supervisor of work equipment with headquarters at Toronto, has been promoted to assistant superintendent of work equipment with the same headquarters.

James E. Davenport, whose appointment as superintendent of fuel and locomotive performance of the New York Central with headquarters at Utica, N. Y., was announced in the *Railway Age* of March 3, page 544, was born on October 8, 1887, at Charlestown, W. Va. Mr. Davenport attended the Georgia School of Technology in 1908 and 1909 and entered railway service on August 1 of the latter year as a special apprentice in the mechanical department of the New York Central. In April, 1912, he was appointed enginehouse foreman and in June, 1914, was advanced to engineer in charge of a dynamometer car. In June, 1917, he was promoted to trainmaster of the Harlem division and in November, 1918, was transferred in a similar capacity to the Mohawk division. In June, 1920, he was appointed engineer of dynamometer tests and served in that capacity until the time of his recent appointment.

Engineering, Maintenance of Way and Signaling

E. H. McGovern, resident engineer of the Cleveland, Cincinnati, Chicago & St. Louis with headquarters at Cincinnati, Ohio, has been promoted to office engineer with the same headquarters succeeding **F. H. Plaisted**, resigned. He will be succeeded by **B. E. Delameter**.

The following appointments have been made in the engineering department of the Central region of the Canadian National: **H. T. Hazen**, assistant chief engineer; **G. P. MacLaren**, engineer maintenance of way; **H. B. Stuart**, bridge engineer; **C. P. Disney**, assistant bridge engineer; **C. H. Tillett**, signal engineer; **A. Crumpton**, valuation engineer.

H. T. Livingston, division engineer of the Chicago, Rock Island & Pacific, with headquarters at Des Moines, Ia., has been transferred to Little Rock, Ark., succeeding **F. P. Funda**, who has been acting division engineer. **W. E. Heimerdinger**, assistant engineer, with headquarters at Estherville, Ia., has been promoted to division engineer, with headquarters at Des Moines, Ia., succeeding Mr. Livingston. **R. C. Baird**, assistant engineer, with headquarters at Chicago, has been transferred to Estherville, Ia., succeeding Mr. Heimerdinger.

R. G. Aylsworth, whose promotion to district engineer maintenance of way of the Wyoming district of the Chicago, Burlington & Quincy, with headquarters at Alliance, Neb., was reported in the *Railway Age* of March 3, was born on

June 9, 1879, at Angola, Ind. He graduated from Cotner University in 1896, and also attended Yale University during 1906 and 1907. He entered railway service in May, 1899, as an axeman on construction in the service of the Chicago, Burlington & Quincy, and was promoted to assistant division engineer on maintenance work in the same year. He served in this capacity until 1903, when he was promoted to division engineer, which position he held until 1906. He served intermittently as division engineer and inspector during the next three years and was appointed resident engineer, with headquarters at Denver, Col., in 1909. He was serving in this capacity at the time of his recent appointment as district engineer maintenance of way, with headquarters at Alliance, Neb.

H. H. Richardson, whose appointment as engineer water service of the Missouri Pacific, with headquarters at St. Louis, Mo., was reported in the *Railway Age* of January 20, was born on July 23, 1897, at Savonburg, Kan. He received his college education at the University of Kansas, Lawrence, Kan. He entered railway service in May, 1918, as a chemist in charge of water softening on the Eastern and Southern districts of the Missouri Pacific, his headquarters at Little Rock, Ark. He was appointed assistant sanitary engineer of the St. Louis Southwestern, with headquarters at Pine Bluff, Ark., in July, 1922, being charged particularly with the conduct of a water survey and a study of the water supply problem. He served in this capacity until January, 1923, at which time he was appointed engineer of water service of the Missouri Pacific, with headquarters at St. Louis. Mr. Richardson succeeded R. C. Bardwell, who resigned to accept the position of superintendent of water supply of the Chesapeake & Ohio, as reported in the *Railway Age* of December 16.



H. H. Richardson

F. L. C. Bond, whose appointment as regional chief engineer of the Canadian National with headquarters at Toronto, Ont., was announced in the *Railway Age* of March 10, page 593, was born on February 21, 1887, at Montreal. He was graduated from McGill University with the degree of bachelor of science in 1898. He entered railway service in 1897 with the Canadian Pacific on the construction of a line near Ottawa, Ont. A short time thereafter he entered the service of the Grand Trunk as assistant engineer. In 1902 he was engaged in subway construction in New York. The following year he was appointed resident engineer of the eastern division of the Grand Trunk and served in that capacity until 1913 when he was promoted to division engineer. In 1917 and 1918 he served with the Canadian forces in France as a major of railway engineers. From December, 1918, until the time of the consolidation of the Grand Trunk with the Canadian National, he served the former company as chief engineer.



F. L. C. Bond

L. Yager, whose promotion to assistant chief engineer of the Northern Pacific with headquarters at St. Paul, Minn., was reported in the *Railway Age* of February 3, was born on July 12, 1877, at Germantown, Wis. He graduated from the University of Minnesota in 1900 and entered railway service in June of that year as rodman and inspector with the Northern Pacific at Brainerd, Minn. He was promoted to assistant engineer in charge of bridge construction between Fargo, N. D., and Billings, Mont., in April, 1901, which position he held until about March, 1902, when he was promoted to supervisor of bridges and buildings with headquarters at Minneapolis, Minn. In February, 1907, he was promoted to assistant engineer on the reconstruction of the St. Louis Bay drawbridge between Duluth, Minn., and Superior, Wis., which position he held for two years. In May, 1909, he was promoted to assistant engineer of construction of the line from Glendive, Mont., to Sidney, and projected lines west of Glendive. He was promoted to division engineer at St. Paul, Minn., in March, 1910, and served in this capacity until January, 1917, when he was promoted to engineer maintenance of way of lines east of Paradise, Mont. From July, 1919, to April, 1920, he served as chief maintenance of way engineer of the United States Railroad Administration at Washington, D. C., returning to the service of the Northern Pacific on the latter date as engineer maintenance of way with headquarters at St. Paul. He was serving in this capacity at the time of his recent promotion to assistant chief engineer with the same headquarters.

Special

W. S. Thompson has been appointed director of publicity of the Canadian National with headquarters at Montreal. Mr. Thompson formerly held a similar position with the Grand Trunk and a photograph and biographical sketch of him appeared in the *Railway Age* of September 30, 1922, page 634.

G. W. Reed has been appointed western editor of the "Earth," the monthly publication of the Atchison, Topeka & Santa Fe, with headquarters at Los Angeles, Cal., and will devote his attention particularly to the development of the agricultural, industrial and colonization movement in the southwest.

Obituary

S. K. Hooper, former assistant to the general traffic manager of the Denver & Rio Grande, with headquarters at Denver, Colo., died in that city on March 18.

William S. Carter, former president of the Brotherhood of Locomotive Firemen and Enginemen, died in Baltimore, Md., on March 15. Mr. Carter was born in Austin, Tex., and attended the Texas Agricultural and Mechanical College. His first railroad experience was as a fireman on the Central Montgomery (now the Gulf, Colorado & Santa Fe). Later he worked in a similar capacity on the International-Great Northern, in Mexico, and on the Missouri-Kansas, Texas. In 1894 he became editor of the firemen's magazine and served as such for ten years when he became grand secretary and treasurer of his brotherhood. He was elected president in 1909. During Federal control Mr. Carter served as director of the Division of Labor under the United States Railroad Administration.

THE BALTIMORE & OHIO reports a reduction in the number of casualties to automobilists at crossings in 1922, as compared with 1921; a reduction of 22 per cent in the number of persons killed and 3 per cent in the number injured; 46 and 142, respectively, compared with 59 and 147 in 1921. There were 381 motor vehicle accidents where no one was injured. Many of these happened when truck drivers came upon the tracks before realizing that a train was approaching and abandoned the machines. The total number of accidents involving all kinds of vehicles and pedestrians, was 571, as compared with 450 in 1921. In the 571 accidents, there were 75 instances where gates were provided and in 471 of them the drivers had a clear and unobstructed view of the track for a long distance.